MOTLoad Firmware Package

User's Manual

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About this Manual

Overview of Contents

The MOTLoad Firmware Package User's Manual provides information on the MOTLoad firmware. It is intended to be used in conjunction with a specific Artesyn board level product, on which this firmware resides, such as the MVME5500, MVME3100, MVME6100, MVME7100, ATCA-F102, and ATCA-C110. This manual provides general information on how to use the firmware, as well as a detailed description of each command. It also provides information on special features provided by MOTLoad (see Appendices).

This manual is divided into the following chapters and appendices.

- Chapter 1, *Introduction*, includes an overview of the MOTLoad firmware, a brief description of the firmware's implementation and memory requirements, command types, utility applications and tests
- Chapter 2, *Using MOTLoad*, provides instructions on how to interact with the firmware including a description of the command line interface, encompassing command line help and command line rules; command history buffer, encompassing pseudo-VI Mode; command line execution modes and MOTLoad manual page formats.
- Chapter 3, *MOTLoad Commands*, provides a list of all current MOTLoad commands followed by a detailed description of each command.
- Appendix A, *MOTLoad Non-Volatile Data*, provides a description of the various types of non-volatile data: VPD, GEV and SPD. Explanations and examples of existing VPD and GEV commands are also provided. SPD is not covered at this time.
- Appendix B, *Remote Start*, describes the remote interface provided by MOTLoad to the host CPU via the backplane bus, which allows the host to obtain information about the target board, download code and/or data, modify memory, and execute a downloaded program.
- Appendix C, *VME Configuration Parameters*, describes how to manage VME configuration parameters for VME-based products.
- Appendix D, *Auto Boot*, provides information on how to auto boot an operating system where no console is required.
- Appendix E, *Safe Start and Alternate Boot Image*, describes MOTLoad's Safe Start mechanism and Alternate Boot Image support that enable customers to recover from inadvertent board configurations.
- Appendix F, *Related Documentation*, lists various documents related to specific devices and industry specifications that are used in conjunction with the MOTLoad product.

Abbreviations

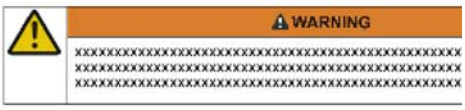
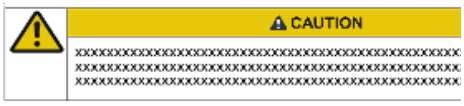
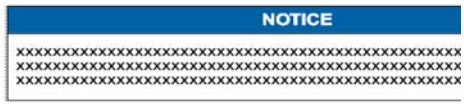
This document uses the following abbreviations:

Abbreviation	Definition
BOOTP	Bootstrap Protocol
DHCP	Dynamic Host Configuration Protocol
GEV	Global Environment Variable
IBCA	Inter-Board Communication Address
NVRAM	Non-Volatile Random Access Memory
PCI	Peripheral Component Interconnect
POST	Power -On Self Test
RTC	Real-Time Clock
SBC	Single Board Computer
SDRAM	Synchronous Dynamic Random Access Memory
SPD	Serial Presence Defect
VME	VMEbus (Versa Module Euro Card)
VPD	Vital Product Data

Conventions

The following table describes the conventions used throughout this manual.

Notation	Description
0x00000000	Typical notation for hexadecimal numbers (digits are 0 through F), for example used for addresses and offsets
0b0000	Same for binary numbers (digits are 0 and 1)
bold	Used to emphasize a word
`Screen`	Used for on-screen output and code related elements or commands in body text

Notation	Description
`Courier + Bold`	Used to characterize user input and to separate it from system output
Reference	Used for references and for table and figure descriptions
File > Exit	Notation for selecting a submenu
<text>	Notation for variables and keys
[text]	Notation for software buttons to click on the screen and parameter description
...	Repeated item for example node 1, node 2, ..., node 12
. . .	Omission of information from example/command that is not necessary at the time being.
..	Ranges, for example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers).
|	Logical OR.
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury
	Indicates a property damage message.
	No danger encountered. Pay attention to important information.

Summary of Changes

This manual has been revised and replaces all prior editions.

Date	Change
February 2015	Re-branded to Artesyn template.
March 2009	The following command was added to Chapter 3: *csUserAltBoot*
April 2008	These commands were added to Chapter 3: *wait* and *waitProbe*.
March 2008	The following commands were added to Chapter 3: *mpuFork*, *mpuShow*, *mpuStart*, *wait*. New GEV descriptions added to Appendix A, *MOTLoad Non-Volatile Data*. Update to Emerson style.
June 2007	Added -n option to the *netBoot* command. Added Network I/O error codes to *tftpGet*, *tftpPut*, *netBoot*, and *ping* commands.
June 2006	Added new commands in support of the ATCA-C110 blade: *docBoot*, *docProgram*, *docRead*, and *testDocHwInt*,
April 2006	• The -r option of the *testSuite* command was updated • Two commands were added to Chapter 3: *flashLock* and *flashUnlock*. • *diskBoot* command was updated. • New appendices added: Appendix C, *VME Configuration Parameters* and Appendix E, *Safe Start and Alternate Boot Image*.

Date	Change
June 2004	● A *Standard Error Codes and Devices* section was added to Chapter 2. ● The following tests and commands were added to Chapter 3: *testThermoOp*, *testThermoQ*, *testThermoRange*, *csb csh csw* and *devShow*. ● A note was added to all memory tests, for example, *testRam*, specifying how the memory is tested. ● An error message field was added to applicable MOTLoad commands in Chapter 3, *MOTLoad Commands*. ● A warning was added to *testDisk* about being destructive. ● The following commands were deleted from Chapter 3: mpuFork, mpuShow, mpuSwitch, testFlash, testI2cRomRd, testI2cRomRdWr, testUsbOscillator, and testUsbVok. ● A *Reserved GEVs* section was added to Appendix A. ● Auto boot instructions were added as an appendix, Appendix D, *Auto Boot*
July 2003	The MOTLoad prompt throughout this document was changed to a generic `MOTLoad>` from a specific product prompt, which will vary depending upon which product was purchased. Some command descriptions were modified and added to Chapter 3, as well as corrections to font and text throughout to reflect more accurately screen displays.

Introduction

1.1 Overview

MOTLoad is a PowerPC firmware package developed for Artesyn's Single Board Computers (SBCs). The first boards using MOTLoad employ a Marvell GT64260A bridge. Subsequent products will use MOTLoad in conjunction with the most recent industry designed bridge devices. MOTLoad is continuously being developed and extended to support newly developed Artesyn products. When new features are added and changes are made, this document will be updated.

The main purpose of the MOTLoad firmware package is to serve as a board power-up and initialization package, and to serve as a vehicle from which user applications can be booted. Although MOTLoad was not specifically designed as a diagnostics application, the test suites and the individual tests (with their various options) provide the user with a significant amount of information that can be used for debug and diagnostic purposes. To use the MOTLoad firmware package successfully, the reader should have some familiarity with the product and firmware methodology.

MOTLoad is controlled through an easy to use, UNIX-like, command line interface. Its format was designed with the application-oriented needs of the end user in mind. Consequently, the MOTLoad software package is similar to that of many end-user applications designed for the embedded market, such as the currently available real-time operating systems. Functionally, this design allows MOTLoad to detect typical system level product devices.

1.1.1 MOTLoad Implementation and Memory Requirements

The implementation of MOTLoad and its memory requirements are product specific. Each of the Artesyn SBCs are offered with a wide range of memory (for example, DRAM, external cache, and flash). Typically, the smallest amount of onboard DRAM that an SBC has is 32 MB. Each supported Artesyn product line has its own unique MOTLoad binary image(s). Currently the largest MOTLoad compressed image is less than 1 MB. During board initialization, the MOTLoad image is decompressed into DRAM, where it executes. A MOTLoad decompressed image can be as large as 2.5 MB.

1.1.2 MOTLoad Commands

MOTLoad supports two groups of commands (applications): utilities and tests. Both types of commands are invoked from the MOTLoad command line in a similar fashion. Beyond that, MOTLoad utilities and MOTLoad tests are distinctly different.

1.1.3 MOTLoad Utility Applications

The definition of a MOTLoad utility application is very broad. Simply stated, it is a MOTLoad command that is not a MOTLoad test. Typically, MOTLoad utility applications are applications that aid the user in some way. From the perspective of MOTLoad, examples of utility applications are: configuration, data/status displays, data manipulation, help routines, data/status monitors, and so on.

Operationally, MOTLoad utility applications differ from MOTLoad test applications in several ways:

- Only one utility application may be operating at any given time (that is, multiple utility applications can not be executing concurrently).
- Utility applications may interact with the user. Most test applications do not.

1.1.4 MOTLoad Tests

A MOTLoad test application determines whether or not the hardware meets a given standard. Test applications are validation tests. Validation is conformance to a specification. Most MOTLoad tests are designed to directly validate the functionality of a specific SBC subsystem or component. It is possible for a board's component to fail in the user application but pass specification conformance. These tests validate the operation of such SBC modules as: dynamic memory, external cache, NVRAM, real time clock, and so on.

All MOTLoad tests are designed to validate functionality with minimum user interaction. Once launched, most MOTLoad tests operate automatically without any user interaction. There are a few tests where the functionality being validated requires user interaction (that is, switch tests, interactive plug-in hardware modules, and so on). Most MOTLoad test results (error-data/status-data) are logged, not printed. Test results are not preserved and therefore not available to user applications subsequent to their execution. All MOTLoad tests/commands are described in detail in Chapter 3, *MOTLoad Commands*.

All devices that are available to MOTLoad for validation/verification testing are represented by a unique device path string. Most MOTLoad tests require the operator to specify a test device at the MOTLoad command line when invoking the test.

A listing of all device path strings can be displayed through the `devShow` command. If a SBC device does not have a device path string it is not supported by MOTLoad and can not be directly tested. There are a few exceptions to the device path string requirement, like testing RAM, which is not considered a true device and can be directly tested without a device path string. Refer to the `devShow` command page in this manual for more information.

Most MOTLoad tests can be organized to execute as a group of related tests (a test suite) through the use of the `testSuite` command. The expert operator can customize their testing by defining and creating a custom test suite(s). The list of built-in and user defined MOTLoad test suites, and their test contents, can be obtained by entering: **`testSuite -d`** at the MOTLoad prompt. All test suites that are included as part of a product specific MOTLoad firmware package are product specific. For more information refer to the `testSuite` command page in this manual.

Test results and test status are obtained through the `testStatus`, `errorDisplay`, and `taskActive` commands. Refer to the appropriate command page(s) in this manual for more information.

Using MOTLoad

2.1 Overview

This chapter describes various command line characteristics, as well as the MOTLoad Manual Page Format.

Interaction with MOTLoad is performed via a command line interface through a serial port on the SBC, which is connected to a terminal or terminal emulator (for example, Window's Hypercomm). The default MOTLoad serial port settings are: 9600 baud, 8 bits, no parity.

2.1.1 Command Line Interface

The MOTLoad command line interface is similar to a UNIX command line shell interface. Commands are initiated by entering a valid MOTLoad command (a text string) at the MOTLoad command line prompt and pressing the carriage-return key to signify the end of input. MOTLoad then performs the specified action. The MOTLoad command line prompt is shown below.

Note: The generic command prompt designation of MOTLoad is for documentation purposes only. The exact command prompt designation is determined by the product being purchased, for example, MVME6100, MVME5500, and so on.

If an invalid MOTLoad command is entered at the MOTLoad command line prompt, MOTLoad displays a message that the command was not found.

Example:

```
MOTLoad>
```

mytest

```
"mytest" not found
MOTLoad>
```

If the user enters a partial MOTLoad command string that can be resolved to a unique valid MOTLoad command and presses the carriage-return key, the command will be executed as if the entire command string had been entered. This feature is a user input shortcut that minimizes the required amount of command line input. MOTLoad is an ever changing firmware package, so user input shortcuts may change as command additions are made.

```
MOTLoad>
```

Example:

```
MOTLoad>
```

version

```
Copyright: Motorola Inc. 1999-2003, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 1.1 RM01
Mon Mar 10 12:01:28 MST 2003
```

Example:

```
MOTLoad>
```

ver

```
Copyright: Motorola Inc. 1999-2003, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 1.1 RM01
Mon Mar 10 12:01:28 MST 2003
```

If the partial command string cannot be resolved to a single unique command, MOTLoad will inform the user that the command was ambiguous.

Example:

```
MOTLoad>
```

te

```
"te" ambiguous
MOTLoad>
```

2.1.2 Command Line Help

Each MOTLoad firmware package has an extensive, product specific, help facility that can be accessed through the help command. The user can enter help at the MOTLoad command line to display a complete listing of all available tests and utilities.

Example:

```
MOTLoad>
```

help

For help with a specific test or utility, the user can enter:

help

<*command_name*> at the MOTLoad prompt. The

help

command also supports a limited form of pattern matching. Refer to the

help

command page.

Example:

```
MOTLoad>
```

help testRam

```
Usage: testRam [-aPh] [-bPh] [-iPd] [-nPh] [-tPd] [-v]
Description: RAM Test Directory
Argument/Option Description
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 MB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Ph: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
MOTLoad>
```

2.1.3 Command Line Rules

There are a few things to remember when entering a MOTLoad command:

- Multiple commands are permitted on a single command line, provided they are separated by a single semicolon(";").
- Spaces separate the various fields on the command line (command/arguments/options).
- The argument/option identifier character is always preceded by a hyphen (“-”) character

- Options are identified by a single character
- Option arguments immediately follow (no spaces) the option
- All commands, command options, device tree strings, and so on are case sensitive

Example:

```
MOTLoad> flashProgram -d/dev/flash0 -n00100000
```

2.1.4 Command History Buffer

MOTLoad saves command line inputs into a command history buffer. Up to 128 previously entered commands can be recalled, edited, and reentered at the command line. Once the desired command appears on the command line it can be re-executed by pressing the carriage-return key.

2.1.5 pseudo-Vi Mode

MOTLoad supports a pseudo-VI editor command recall through the ESC and the j and k keys. Typing

ESC

and then

k

moves backwards through the history command buffer and displays the preceding commands. Typing

ESC

and then

j

moves forward through the history command buffer and displays the more recent commands. After the

ESC

key is pressed, the

j

and/or

k

key may be pressed as often as needed to bring up the desired command from the command history buffer.

2.1.6 Command Line Execution Modes

MOTLoad utilities such as help always execute in the foreground. MOTLoad tests can be executed in the foreground (sequentially) or in the background (concurrently) as background tasks.

Note Not all tests can execute in background mode. As an example, cache tests must run in the foreground.

When a sequential test starts executing in the foreground, no new MOTLoad tests can execute until the current test running in the foreground is complete. This does not apply to background tests.

Example:

```
MOTLoad>
```

testRam

In concurrent test mode, each test gets a time sliced share of the CPU execution time. The amount of user control over the background task time slicing operations is determined by the underlying OS. The operator specifies concurrent test execution by ending the test command line with the ampersand (&) character (prior to the carriage-return). The MOTLoad command prompt reappears after a concurrent test is started.

Example:

```
MOTLoad>
```

testRam &

After the MOTLoad prompt reappears, another test or utility may be started (in the foreground or background execution mode) as long as it does not interfere (use the same computer resources) with the operations of other test(s) running in background mode. The test execution status of a test(s) running in background mode can be monitored through the use of the `taskActive` and `testStatus` commands. Refer to the appropriate man pages for more details.

2.1.7 Copying/Transferring MOTLoad Images

Flash images can be copied between memory and flash, or between flash banks, by the use of the `flashProgram` utility. Extreme care should be taken in this process to ensure that accidental overwriting of the bootloader code and/or MOTLoad does not occur. It is advised that you never program the boot block of the active flash bank (the one from which the board was booted). This ensures that the bootloader image is never overwritten by `flashProgram`.

The bootloader resides in the boot block of each flash bank. If both images have been overwritten, the board may be unbootable. Further, since `flashProgram` is a component within MOTLoad, the user is not able to reprogram (reflash) the boot block to effect recovery.

The utility `flashShow` indicates which flash bank is the active flash bank and provides its base address and size. Also refer to the Programmer's Reference Guide and/or Installation and Use manual for your board.

The boot block is the last (highest address) 1 MB of a flash bank. `flashProgram` writes to an offset from the base (lowest address) of a flash bank. The source for the image being programmed can be any addressable memory; for example, SDRAM, NVRAM, or flash.

2.2 MOTLoad Command Description Page Format

All MOTLoad command pages follow the format described below.

Name

This field names the test or utility as it would appear on the MOTLoad command line. It also provides a description of the command, for example:

`errorDisplay` - displays the Contents of the MOTLoad Test Error Status Table

Synopsis

This field shows command line usage or syntax of a command, test, or utility. This consists of the name of the command, test or utility, and a list of all possible arguments/options, for example:

```
errorDisplay [-eP*] [-nP*] [-sP*]
```

If an argument is optional, it is enclosed in a set of braces [ ], otherwise it is required.

If an asterisk (*) or other symbol follows an option, another argument is required with that option.

The asterisk (*) symbol means that a number of valid numeric base conversion option arguments are possible. Refer to the table titled Number Base Specifiers for more information.

An attempt has been made to standardize the meaning of option arguments but the exact meaning of an option and its arguments is test specific. Exact option information can be displayed through the use of the `help` command or by referring the appropriate man page.

Parameter

This field describes each argument and option of the command, for example:

```
-a P*: Executive Process/Task Identifier of Entry to Display
-n P*: Number of Entries to Display
-s P*: Specific Entry Number (1 to n) to Display
```

Example

This field shows how the command, test, or utility is typically used. The command line invocation of the command, test, or utility and the subsequent displayed results are shown. In some cases extensive examples are provided, for example:

```
MOTLoad> errorDisplay

tName =testDisk -d/dev/ide0/hdisk2 -n5000
sPID=00000011 ePID=00000014 eS.eM = 2.1 entryNo = 00000001
sErrNo=00000000 eErrNo=0C0000002C errCnt=00000001 loopCnt-00000000
sTime=43:48:15 fTime=43:48:15 eTime=00:00:00 1Time=15:51:54
Error Messages:
Data Comparison Failure in Block Range 0-255
Write/Read Date: 05F0436F/00000000
Write/Read Address: 008E1000/00*C0000
Device-Name =/dev/ide0/hdisk2
```

Error Messages

This field shows the known error messages output by MOTLoad. This field is only applicable to commands, not tests.

```
Assembler Error:error code = <value>
Error code not in table
```

See Also

This field lists tests/utilities that are functionally related to the described command, for example: `clear`, `testStatus`

2.3 User Download Buffer

In order to accommodate for the storage of data generated by one or more MOTLoad commands that are not given a specific memory path or location, MOTLoad employs a temporary memory buffer, known as the User Download Buffer.

NOTICE

The size of the User Download Buffer is 2 MB. Commands will fail if the user attempts to load more than 2 MB into the buffer. In cases where more than 2 MB are needed, the user should use the **`malloc`** command (**`malloc`** <*size*>) to create a buffer of suitable size.
Typing malloc <*size*> on the command line where *size* is the number of bytes requested causes MOTLoad to allocate an area of RAM that can be used by the user. The address of the start of the RAM buffer area is returned to the user. An address of "0" indicates that the request failed.

2.4 Standard Error Codes and Devices

This section describes error message formats and a generalized listing of error number (errno) values. As with any code application, MOTLoad is continually being revised and new error messages may appear.

2.4.1 Error Message Formats

MOTLoad displays error messages in one of six formats:

```
function_name(): open(<device_name>) failed, errno=<value>
function_name(): ioctl(<value>) failed, errno=<value>
function_name(): io_operation([device]) failed, errno=<value>
function_name(): error_message, errno=<value>
function_name(): error_message
error_messsage
```

In some cases, the message format may vary slightly from the above. For these messages, the format and meaning is identified under the Error Messages section for the affected command.

When the operation attempts to open a device but encounters a failure during the open process, the `open` message is displayed and identifies the complete device name (for example, `/dev/ide0/hdisk0`).

When a general IOCTL command fails, the ioctl value identifies the failing I/O operation of a specific device type; for example, block, terminal, tape, and so on. For an example set of IOCTL codes, refer to the IOCTL Codes (Block) table (below). It is not necessary to know all the codes for each type of device since the individual error message sections define the meaning of each ioctl error message.

2.4.2 IOCTL Codes (Block)

The following table lists the IOCTL codes:

IOBLOCK_IOCTL_GET_DEVICE_TYPE	100
IOBLOCK_IOCTL_STATUS	101
IOBLOCK_IOCTL_RESET	102
IOBLOCK_IOCTL_GET_BLOCK_SIZE	103
IOBLOCK_IOCTL_NBLOCKS	104
IOBLOCK_IOCTL_FORMAT	105
IOBLOCK_IOCTL_SEEK_SET	106
IOBLOCK_IOCTL_SEEK_CURRENT	107
IOBLOCK_IOCTL_SEEK_END	108

IOBLOCK_IOCTL_DISK_CHANGE	109
IOBLOCK_IOCTL_MOTOR_ON	110
IOBLOCK_IOCTL_MOTOR_OFF	111
IOBLOCK_IOCTL_BSEEK_SET	112
IOBLOCK_IOCTL_BSEEK_CURRENT	113
IOBLOCK_IOCTL_BSEEK_END	114

Error numbers (errno) can be derived from either the standard I/O error codes as listed in the Standard Error Codes (errno) table or from driver-/device-specific errors. Error codes unique to either the driver or the device are greater than 0x00010000. Currently, only the standard I/O error codes are used for utilities.

2.4.3 Standard Error Codes (errno)

The following table lists the standard error codes (errno):

IOSTD_ERROR_DEVICE_NOT_FOUND	1	/* device not found */
IOSTD_ERROR_FD_TABLE_FULL	2	/* file descriptor table full */
IOSTD_ERROR_FD_NOT_FOUND	3	/* file descriptor not found */
IOSTD_ERROR_FD_NOT_VALID	4	/* invalid file descriptor */
IOSTD_ERROR_MODE_CONFLICT	5	/* mode conflict */
IOSTD_ERROR_ILLEGAL_REQUEST	6	/* illegal request */
IOSTD_ERROR_DEVICE_TYPE_INVALID	7	/* invalid device type */
IOSTD_ERROR_DEVICE_TYPE_UNKNOWN	8	/* unknown device type */
IOSTD_ERROR_DEVICE_LOCKED	9	/* device locked */
IOSTD_ERROR_DEVICE_WRITE	10	/* device write error */
IOSTD_ERROR_DEVICE_READ	11	/* device read error */
IOSTD_ERROR_UNKNOWN_IOCTL	12	/* unknown ioctl function */
IOSTD_ERROR_OWNERSHIP	13	/* ownership failure */

MOTLoad Commands

3.1 Overview

This chapter lists the current valid MOTLoad commands. The remainder of the chapter describes each command in detail.

3.1.1 MOTLoad Command List

The following table provides a list of all current MOTLoad commands. Products supported by MOTLoad may or may not employ the full command set. Typing help at the MOTLoad command prompt displays all commands supported by MOTLoad for a given product.

Note The command prompt designation for this manual is `MOTLoad`; however, the command prompt for your specific version of MOTLoad is the product designator for your particular board, for example, MVME6100, MVME5500.

Table 3-1 MOTLoad Commands

Command	Description
as	One-Line Instruction Assembler
bcb bch bcw	Block Compare Byte/Halfword/Word
bdTempShow	Display Current Board Temperature
bfb bfh bfw	Block Fill Byte/Halfword/Word
blkCp	Block Copy
blkFmt	Block Format
blkRd	Block Read
blkShow	Block Show Device Configuration Data
blkVe	Block Verify
blkWr	Block Write
bmb bmh bmw	Block Move Byte/Halfword/Word
br	Assign/Delete/Display User-Program Break-Points
bsb bsh bsw	Block Search Byte/Halfword/Word
bvb bvh bvw	Block Verify Byte/Halfword/Word

Table 3-1 MOTLoad Commands (continued)

Command	Description
cdDir	ISO9660 File System Directory Listing
cdGet	ISO9660 File System File Load
clear	Clear the Specified Status/History Table(s)
cm	Turns on Concurrent Mode (connect to Host)
csb csh csw	Calculates a Checksum Specified by Command-line Options
csUserAltBoot	Checksums user boot images specified in the alternate boot image header at the beginning of files to be programmed into flash memory.
devShow	Display (Show) Device/Node Table
diskBoot	Disk Boot (Direct-Access Mass-Storage Device)
docBoot	Boots the kernel image stored in the binary partition of the Disk on Chip (DoC)
docProgram	Programs an image residing in the RAM into the binary partition of the DoC
docRead	Reads the contents of the specified binary partition into the RAM
downLoad	Down Load S-Record from Host
ds	One-Line Instruction Disassembler
echo	Echo a Line of Text
elfLoader	ELF Object File Loader
errorDisplay	Display the Contents of the Test Error Status Table
eval	Evaluate Expression
execProgram	Execute Program
fatDir	FAT File System Directory Listing
fatGet	FAT File System File Load
fdShow	Display (Show) File Descriptor
flashLock	Set Sector Protection on Specified Flash Device
flashProgram	Flash Memory Program
flashShow	Display Flash Memory Device Configuration Data
flashUnlock	Clears Sector Protection on Specified Flash Device
gd	Go Execute User-Program Direct (Ignore Break-Points)

Table 3-1 MOTLoad Commands (continued)

Command	Description
gevDelete	Global Environment Variable Delete
gevDump	Global Environment Variable(s) Dump (NVRAM Header + Data)
gevEdit	Global Environment Variable Edit
gevInit	Global Environment Variable Area Initialize (NVRAM Header)
gevList	Lists the Global Environment Variables
gevShow	Global Environment Variable Show
gn	Go Execute User-Program to Next Instruction
go	Go Execute User-Program
gt	Go Execute User-Program to Temporary Break-Point
hbd	Display History Buffer
hbx	Execute History Buffer Entry
help	Display Command/Test Help Strings
l2CacheShow	Display state of L2 Cache and L2CR register contents
l3CacheShow	Display state of L3 Cache and L3CR register contents
mdb mdh mdw	Memory Display Bytes/Half words/Words
memShow	Display Memory Allocation
mmb mmh mmw	Memory Modify Bytes/Half words/Words
mpuFork	Execute program from idle processor
mpuShow	Display multi-processor control structure
mpuStart	Start the other MPU
netBoot	Network Boot (BOOT/TFTP)
netShow	Display Network Interface Configuration Data
netShut	Disable (Shutdown) Network Interface
netStats	Display Network Interface Statistics Data
noCm	Turns off Concurrent Mode
pciDataRd	Read PCI Device Configuration Header Register
pciDataWr	Write PCI Device Configuration Header Register

Table 3-1 MOTLoad Commands (continued)

Command	Description
pciDump	Dump PCI Device Configuration Header Register
pciShow	Display PCI Device Configuration Header Register
pciSpace	Display PCI Device Address Space Allocation
ping	Ping Network Host
portSet	Port Set
portShow	Display Port Device Configuration Data
rd	User Program Register Display
reset	Reset System
rs	User Program Register Set
set	Set Date and Time
sromRead	SROM Read
sromWrite	SROM Write
sta	Symbol Table Attach
stl	Symbol Table Lookup
stop	Stop Date and Time (Power-Save Mode)
taskActive	Display the Contents of the Active Task Table
tc	Trace (Single-Step) User Program
td	Trace (Single-Step) User Program to Address
testDisk	Test Disk
testDocHwInt	Verifies the hardware connectivity of the DoC by reading and verifying the chip ID
testEnetPtP	Ethernet Point-to-Point
testNvramRd	NVRAM Read
testNvramRdWr	NVRAM Read/Write (Destructive)
testRam	RAM Test (Directory)
testRamAddr	RAM Addressing
testRamAlt	RAM Alternating

Table 3-1 MOTLoad Commands (continued)

Command	Description
testRamBitToggle	RAM Bit Toggle
testRamBounce	RAM Bounce
testRamCodeCopy	RAM Code Copy and Execute
testRamEccMonitor	Monitor for ECC Errors
testRamMarch	RAM March
testRamPatterns	RAM Patterns
testRamPerm	RAM Permutations
testRamQuick	RAM Quick
testRamRandom	RAM Random Data Patterns
testRtcAlarm	RTC Alarm
testRtcReset	RTC Reset
testRtcRollOver	RTC Rollover
testRtcTick	RTC Tick
testSerialExtLoop	Serial External Loopback
testSerialIntLoop	Serial Internal Loopback
testStatus	Display the Contents of the Test Status Table
testSuite	Execute Test Suite
testSuiteMake	Make (Create) Test Suite
testThermoOp	Thermometer Temp Limit Operational Test
testThermoQ	Thermometer Temp Limit Quick Test
testThermoRange	Tests That Board Thermometer is Within Range
testWatchdogTimer	Watchdog Timer Device Accuracy Test
tftpGet	TFTP Get
tftpPut	TFTP Put
time	Display Date and Time
transparentMode	Transparent Mode (Connect to Host)
tsShow	Display Task Status

Table 3-1 MOTLoad Commands (continued)

Command	Description
upLoad	Up Load Binary-Data from Target
version	Display Version String(s)
vmeCfg	Manages User-specified VME Configuration Parameters
vpdDisplay	VPD Display
vpdEdit	VPD Edit
wait	Wait for n Seconds or Until all Tests Complete
waitProbe	Wait for I/O Probe to Complete

3.1.2 as

Name

as—provides access to the one-line assembler. By default, the memory location to place the user entered PowerPC assembly instructions is the User Download Buffer.

Synopsis

```
as [-a]
```

Parameter

```
-a Ph: Assembly Address (Default = User Download Buffer)
```

Example

The following example depicts a typical result of entering the as command.

```
MOTLoad> as –a00560000

00560000 00000000 word         0x00000000? lwz r3, 0x0(x3)
-- the above line will be replaced with the following --
00560000 80630000 lwz           r3,0x0(r3)
```

Error Messages

Error messages returned from the as command take one of the following forms depending upon whether it is a known error.

Assembler Error: <error_message>

where <*error_message*> is one of the following:

An Operand has a Length of Zero
Unknown Mnemonic
Excessive Operand(s)
Missing Operand(s)
Operand Type Not Found
Operand Prefix
Operand Address Misalignment

Operand Displacement
Operand Sign Extension
Operand Data Field Overflow
Operand Conversion
Operand Sign Extension
Operand Data Field Overflow
Operand Conversion

Assembler Error: error code = <value>

Undefined error return (<value>).

See Also

br, *ds*, *gd*, *gn*, *go*, *gt*, *rd*, *rs*, *tc*, *td*

3.1.3 bcb bch bcw

Name

bcb, bch, bcw—compares the contents of two memory blocks as specified by the command-line options.

Synopsis

```
bcb/bch/bcw -a -b -c
```

Parameters

```
-a Ph: Starting Address of Block 1
-b Ph: Ending Address of Block 1
-c Ph: Starting Address of Block 2
```

Example

The following example shows a typical result of entering the bcw, bch, and bcb commands.

```
MOTLoad> bcw –a100000 –b100004 –c560000

00100000|7C3043A6 00560000|80630000

MOTLoad> bch –a100000 –b100004 –c560000

00100000|7C30          005600000|8063
00100002|43A6          005600002|0000

MOTLoad> bcb –a100000 –b100004 –c560000

00100000|7C            00560000|80
00100001|30            00560001|63
00100002|43            00560002|00
00100003|A6            00560003|00
```

See Also

bfb bfh bfw, *bmb bmh bmw*, *bsb bsh bsw*, *bvb bvh bvw*

3.1.4 bdTempShow

Name

bdTempShow—displays the current board temperature(s). The information displayed may vary dependent upon the hardware.

Synopsis

```
bdTempShow
```

Parameters

none

Example

The following example shows a typical result of entering the bdTempShow command:

```
MOTLoad> bdTempShow

Cpu TAU Temp=030C Therm Sensor = 27.0C
MOTLoad>
```

The TAU value has a variation of ±25°C; however, the DS1621 thermal sensor has an accuracy of ±0.5°C. This sensor is usually located on the secondary side of the board, centered near the lower edge.

See Also

3.1.5 bfb bfh bfw

Name

bfb, bfh, bfw—fills the contents of a memory block with a pattern, as specified by the command-line options.

Synopsis

```
bfb/bfh/bfw -a -b -d [-i]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Fill Data Pattern
-i Ph: Fill Data Increment (Default = 00000000/0000/00)
```

Example

The following example shows a typical usage of the bfw, bfh and bfb commands:

`MOTLoad>` bfw –a100000 –b100004 –d00000004 –il

`MOTLoad>` bfh –a100000 –b100004 –d0008 –il

`MOTLoad>` bfb –a100000 –b100004 –dFF –il

See Also

bcb bch bcw, *bmb bmh bmw*, *bsb bsh bsw*, *bvb bvh bvw*

3.1.6 blkCp

Name

blkCp—copies the number of blocks, specified by the user, from the device to the destination device. This command only operates on 'block devices'.

Synopsis

```
blkCp -a -b [-n] [-s]
```

Parameters

```
-a Ps: Device Name of Source
-b Ps: Device Name of Destination
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
```

Example

The following example shows a typical result of entering the **blkCP** command:

```
MOTLoad> blkCp -a/dev/ide0/hdisk0 -b/dev/ide0/hdisk0 -n200
```

Error Messages

blockCopy(): malloc(0x20000) failed

Unable to malloc a local buffer of 128 KB.

blockCopy(): open(<filename>) failed, errno = <value>

Unable to open source/destination device/node.

blockCopy(): ioctl(103) failed, errno = <value>

Unable to retrieve the physical block size of the source/destination device.

blockCopy(): bseek() failed, errno = <value>

Seek to desired block (starting block of transfer) on source/destination.

blockCopy(): unequal block sizes not supported

Block size of source device != that of destination.

blockCopy(): read() failed, status = <value>, errno = <value>

Read error on source device.

blockCopy(): write() failed, status = <value>, errno = <value>

Write error on destination device.

See Also

blkFmt, *blkRd*, *blkShow*, *blkVe*, *blkWr*

3.1.7 blkFmt

Name

blkFmt—formats a block device specified by the user. This command only operates on 'block devices'.

Synopsis

```
blkFmt [-d] [-i]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-i 0: Ignore Grown Defect List
```

Example

The following example shows a typical result when **blkFmt** is entered.

```
MOTLoad> blkFmt -d/dev/ide0/hdisk0
```

Error Messages

blockFormat(): open(<device/node name>) failed, errno = <value>

Failure on opening specified device/node.

blockFormat(): ioctl(105) failed, errno = <value>

Format command failed.

See Also

blkCp, *blkRd*, *blkShow*, *blkVe*, *blkWr*

3.1.8 blkRd

Name

blkRd—reads the number of blocks, specified by the user, from the specified device to a memory address. This command only operates on 'block devices'.

Synopsis

```
blkRd [-d] [-m] [-n] [-s] [-t]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-m Ph: Memory Address (Default = User Download Buffer)
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
-t 0 : Display Elapsed Time
```

Example

The following examples shows a typical response from entering the **blkRd** command.

```
MOTLoad> blkRd -d/dev/ide0/hdisk0 -n20 -t
blkRd( ):   number of bytes         =  00004000 (&16384)
blkRd( ):   number of micro-seconds =  00004170 (&16752)
blkRd( ):   bytes/second             =  (not measurable)
```

Error Messages

blockRead(): open(<device/node>) failed, errno = <value>

Unable to open input device.

blockRead(): ioctl(103) failed, errno = <value>

Unable to determine block size of device/node.

blockRead(): bseek() failed, errno = <value>

Unable to seek to specified starting block.

blockRead(): read() failed, errno = <value>

Unable to read block from device/node.

See Also

blkCp, *blkFmt*, *blkShow*, *blkVe*, *blkWr*

3.1.9 blkShow

Name

blkShow—displays all MOTLoad configured block devices. This command's purpose is to display all MOTLoad configured block devices.

Synopsis

```
blkShow
```

Examples

The following examples show a typical output when a **blkShow** command is entered.

```
MOTLoad> blkShow

 Block-Device        N-Blocks     B-Size       Type
 /dev/nvram          00007FF0     00000001     NVRAM
 /dev/i2c/srom/90    00000002     00000001     SROM
 /dev/i2c/srom/A0    00000100     00000001     SROM
 /dev/i2c/srom/A2    00000100     00000001     SROM
 /dev/i2c/srom/A4    00000100     00000001     SROM
 /dev/i2c/srom/A6    00002000     00000001     SROM
 /dev/i2c/srom/A8    00002000     00000001     SROM
 /dev/i2c/srom/AA    00002000     00000001     SROM
 /dev/ide0/hdisk2    026016F0     00000200     Disk
```

See Also

blkCp, *blkFmt*, *blkRd*, *blkVe*, *blkWr*

3.1.10 blkVe

Name

blkVe—verifies the number of blocks, specified by the user, between the source device to the destination device. This command only operates on 'block devices'.

Synopsis

```
blkVe -a -b [-n] [-s]
```

Parameters

```
-a Ps: Device Name of Source
-b Ps: Device Name of Destination
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
```

Example

The following example indicates a typical display when using the **blkVe** command.

```
MOTLoad> blkVe -a/dev/ide0/hdisk0 -b/dev/ide0/hdisk1 -n8

 blkVe(): data miscompare:  offset = 00000000,  data = 80/05
 blkVe(): data miscompare:  offset = 00000001,  data = 08/F0
 blkVe(): data miscompare:  offset = 00000002,  data = 04/43
 blkVe(): data miscompare:  offset = 00000003,  data = 0D/6F
 blkVe(): data miscompare:  offset = 00000004,  data = 0A/03
 blkVe(): data miscompare:  offset = 00000005,  data = 01/F5
 blkVe(): data miscompare:  offset = 00000006,  data = 48/82
 blkVe(): data miscompare:  offset = 00000007,  data = 00/4A
```

Error Messages

blockVerify(): malloc(0x20000) failed

Unable to malloc a local buffer of 128 KB for either source or destination.

blockVerify(): open(<source/destination device/node>) failed, errno = <value>

Unable to open either source or destination device/node.

blockVerify(): ioctl(103) failed, errno = <value>

Unable to get block size of source/destination device/node.

blockVerify(): bseek() failed, errno = <value>

Unable to seek to either source/destination starting block number.

blockVerify(): unequal block sizes not supported

Block size of source and destination are not equal.

blockVerify(): read() failed, status = <value>, errno = <value>, device = <value>

Unable to read from either source/destination device/node.

See Also

blkCp, *blkFmt*, *blkRd*, *blkShow*, *blkWr*

3.1.11 blkWr

Name

blkWr—writes the number of blocks, specified by the user, from the memory address to the specified device. This command only operates on 'block devices'.

Synopsis

```
blkWr [-d] [-m] [-n] [-s] [-t]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-m Ph: Memory Address (Default = User Download Buffer)
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
-t 0: Display Elapsed Time
```

Example

The following example indicates a typical display when using the **blkVe** command.

```
MOTLoad> blkWr -d/dev/ide0/hdisk0 -n20 -t
blkWr(): number of bytes         = 00004000 (&16384)
blkWr(): number of micro-seconds = 00000283 (&643)
blkWr(): bytes/second            = (not measurable)
```

Error Messages

blockWr(): open(<device/node>) failed, errno = <value>

Unable to open input device/node.

blockWrite(): ioctl(103) failed, errno = <value>

Unable to determine block size of device/node.

blockWrite(): bseek() failed, errno = <value>

Unable to seek to specified starting block.

blockWrite(): write() failed, status = <value> errno = <value>

Unable to write to specified device/node.

See Also

blkCp, *blkFmt*, *blkShow*, *blkVe*, *blkWr*

3.1.12 bmb bmh bmw

Name

bmb, bmh, bmw—moves (copies) the contents of a memory block from one location to another, as specified by the command-line options.

Synopsis

```
bmb/bmh/bmw -aPh -bPh -cPh
```

Parameters

```
bmb
-a Ph: Starting Address of Source Block
-b Ph: Ending Address of Block
-c Ph: Starting Address of Destination Block
bmh
-a Ph: Starting Address of Source Block (half-word aligned)
-b Ph: Addr of Last Source Half-Word to be copied (half-word aligned)
-c Ph: Starting Address of Destination Block
bmw
-a Ph: Starting Address of Source Block (word aligned)
-b Ph: Addr of Last Source Word to be copied (word aligned)
-c Ph: Starting Address of Destination Block
```

Example

The following example indicates a typical display when using the **bmb**, **bmh**, and **bmw** commands.

```
MOTLoad> bmw -a00560000 -b00560020 -c00560040
MOTLoad> bmh -a00560000 -b00560020 -c00560040
MOTLoad> bmb -a00560000 -b00560020 -c00560040
```

See Also

bcb bch bcw, *bfb bfh bfw*, *bsb bsh bsw*, *bvb bvh bvw*

3.1.13 br

Name

br—assigns, deletes, or displays user-program break points.

Synopsis

```
br [-a] [-c] [-d]
```

Parameters

```
-a Ph: Address
-c Pd: Count (Default = 0)
-d 0: Delete Specified/All Break-Points
```

Example

The following example indicates a typical display when using the **bmb**, **bmh**, and **bmw** commands.

```
MOTLoad> br -a00100000 <---Adds a break-point
Address  Count    Label
00100000 00000000 evtbl+0x000

MOTLoad> br           <---Displays all break-points
Address  Count    Label
00100000 00000000 evtbl+0x000
00100100 00000002 evtbl+0x100

MOTLoad> br -a00100100 -d <---Deletes break-point at specified address
Address  Count    Label
00100000 00000000 evtbl+0x000

MOTLoad> br -d       <---Deletes all break-points
```

See Also

as, *ds*, *gd*, *gn*, *go*, *gt*, *rd*, *rs*, *tc*, *tc*

3.1.14 bsb bsh bsw

Name

bsb, **bsh**, **bsw**—searches the contents of a memory block for a specific data pattern, as specified by the command-line options.

Synopsis

```
bsb/bsh/bsw -a -b -d [-n] [-z]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Search Data Pattern
-n 0: Non-Matching Data (Default = Matching)
-z Ph: Search Data Mask (Default = FFFFFFFF/FFFF/FF)
```

Example

The following example indicates a typical display when using the **bsb**, **bsh**, and **bsw** commands.

```
MOTLoad> bsw -a00560000 -b00560010 -d12345678
pattern not found


MOTLoad> bsw -a00560000 -b00560010 -d11111111
00560000|11111111
```

See Also

bcb bch bcw, *bfb bfh bfw*, *bmb bmh bmw*, *bvb bvh bvw*

3.1.15 bvb bvh bvw

Name

bvb, **bvh**, **bvw**—verifies the contents of a memory block for a specific data pattern, as specified by the command-line options. Only non-matching data patterns are displayed.

Synopsis

```
bvb/bvh/bvw -a -b -d [-i]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Verify Data Pattern
-i Ph: Fill Data Increment (Default = 00000000/0000/00)
```

Example

The following example indicates a typical display when using the **bsb**, **bsh**, and **bsw** commands.

```
MOTLoad> mdw -a00560000 -c4
00560000 11111111 22222222 33333333 44444444

MOTLoad> bvw -a00560000 -b00560010 -d22222222
00560000|11111111 00560008|33333333 0056000C|44444444
```

See Also

bcb bch bcw, *bfb bfh bfw*, *bmb bmh bmw*, *bsb bsh bsw*

3.1.16 cdDir

Name

cdDir—displays the contents of a CDROM that is formatted with an ISO9660 file system (8.3 naming convention). Caveats: Symbolic links are not supported. ISO9660 extensions are not supported (e.g., RockRidge).

Synopsis

```
cdDir [-ddevicename] [-fpathname] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/ide0/cdrom1)
-f Ps: File Name. (specify preceding '*' for wildcard)
-v 0: Full Listing.
```

Example

The following example indicates a typical display when using the **cdDir** command.

```
MOTLoad> cdDir -d/dev/scsi0/cdrom6 -f*.exe -v
 496368 /quick1.exe

    1257 /moveit~2.exe
```

Error Messages

iso9660Dir(): open(<device>) failed, errno = <value>

Unable to open specified CD-ROM device.

cdromInfo(): malloc() failed

Unable to allocate internal buffer for CD-ROM directory block.

cdromInfo(): read(/dev/cdrom) failed, errno = <value>

Unable to read in primary volume descriptor.

cdromInfo(): malloc() failed

Unable to malloc buffer for path table records.

cdromInfo(): read(/dev/cdrom) failed, errno = <value>

Unable to read path table records.

WARNING: encountered too large directory

CD-ROM directory exceeds 20480.

See Also

cdGet

3.1.17 cdGet

Name

cdGet—copies (GETs) the specified file from a CDROM that is formatted with an ISO9660 file system (8.3 naming convention). Caveats: Symbolic links are not supported. ISO9660 extensions are not supported (for example, RockRidge). If the specified file name matches more than one file on the CD, the first matching file encountered is loaded.

Synopsis

```
cdGet [-ddevicename] -ffilename [-laddress]
```

Parameters

```
-d Ps: Device Name (Default = /dev/ide0/cdrom1)
-f Ps: File Name.
-l Ph: Load Address (Default = User Download Buffer.
```

Example

The following example indicates a typical display when using the **cdGet** command.

```
MOTLoad> cdGet -d/dev/idel/cdrom1 -ftest1.elf
cdGet(): 00011E66 (&73318) bytes loaded at address 006B6000

MOTLoad> cdGET -d/dev/idel/cdrom1 -f*.elf -l800000
cdGet(): 00011E66 (&73318) bytes loaded at address 00800000
```

Error Messages

iso9660Get(): open(/dev/cdrom) failed, errno = <value>

Unable to open CD-ROM device/node.

cdGet(): file load failed -- <file name> not found.

Unable to locate filename specified.

cdGet(): file too large <filesize (hex)> (<filesize (decimal)>) for user buffer

File larger than buffer.

cdGet(): file load failed, status = <value>, errno = <value>

File read error.

See Also

cdDir, *diskBoot*

3.1.18 clear

Name

clear—clears the tables specified by the command-line options. By default this command clears the MOTLoad command history buffer.

Synopsis

```
clear [-c] [-e] [-h]
```

Parameters

```
-c 0: Test Completion (Pass/Fail) Status History Table
-e 0: Test Error (Error Messages) Status History Table
-h 0: Command-Line History Table
```

Example

The following example indicates a typical display when using the **clear** command.

```
MOTLoad> errorDisplay
  tName =testDisk -d/dev/ide0/hdisk2 -n5000
    sPID=00000011 ePID=00000014 eS.eM=2.1 entryNo=00000001
     sErrNo=00000000 eErrNo=0C00002C errCnt=00000001 loopCnt=00000000
    sTime=43:48:15 fTime=43:48:15 eTime=00:00:00 lTime=15:51:54
  Error Messages:
  Data Comparison Failure in Block Range 0-255
  Write/Read Data   : 05F0436F/00000000
  Write/Read Address: 008E1000/00*C0000
  Device-Name = /dev/ide0/hdisk2

MOTLoad> clear -e
```

See Also

errorDisplay, *hbd*, *hbx*, *testStatus*

3.1.19 cm

Name

cm—mirrors the debug port to a second onboard serial port that is specified by the command options.

Synopsis

```
cm [-bPd] [-dPs] [-pPs] [-sPd] [-wPd]
```

Parameters

```
-b  Pd: Baud Rate (Default = 9600)
-d  Ps: Serial-Port Device Name (Default = /dev/com2)
-p  Ps: Parity (e/o) (Default = No)
-s  Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the cm command.

```
MOTLoad> cm
Concurrent Mode Activated

MOTLoad>
```

Error Messages

cm(): ioctl(<value>) failed, errno = <value>

Unable to set specified COM port.

cm(): device settings argument error

Invalid setting for specified COM port.

cm(): open(<device>) failed, errno = <value>

Couldn't open port.

See Also

noCm

3.1.20 csb csh csw

Name

csb, **csh**, **csw**—calculates a checksum over a range as specified by the command-line options.

Synopsis

```
csb/csh/csw [-a] [-c]
```

Parameters

csb

```
-a Ph: Starting Address (Default = User Download Buffer)
-c Ph: Number of Bytes to Checksum (Default = 0x00100000)
```

csh

```
-a Ph: Starting Address (Default = User Download Buffer)
-c Ph: Number of Half-Words to Checksum (Default = 0x00080000)
```

csw

```
-a Ph: Starting Address (Default = User Download Buffer)
-c Ph: Number of Words to Checksum (Default = 0x00040000)
```

Example

The following examples show typical results of entering the **csw**, **csh**, and **csw** commands.

```
MOTLoadI> csw -a05000000 -c1000
Checksum: 4BA41394
MOTLoadI>

MOTLoadI> csh -af3f00000 -c7ffff
Checksum: 66CD
MOTLoadI>

MOTLoadI> csb
Checksum: 0A
MOTLoadI>
```

3.1.21 csUserAltBoot

Name

csUserAltBoot—checksums user boot images specified in the alternate boot image header at the beginning of files to be programmed into flash memory. As part of the process, the command executes validity checks to insure the integrity of the boot image header before calculating the checksum. Files up to six megabytes can use this command to provide the checksum needed by MOTLoad in order to pass program execution to the user defined image.

Synopsis

```
csUserAltBoot [-a]
```

Parameters

```
-a Ph: Starting Address (Default = User Download Buffer)
```

Example

The following examples show typical results of entering the **csUserAltBoot** command.

```
MOTLoadI> csUserAltBoot -a5000000
checksum = 52628d9f
MOTLoadI>
```

3.1.22 devShow

Name

devShow—displays the MOTLoad device table

Synopsis

```
devShow [-p] [-v]
```

Parameters

```
-p O: Display physical properties of each device
-v O: Display driver information for each device
```

Example

The following example indicates a typical display when using the **devShow** command.

```
MOTLoad> devShow
/dev/com1
/dev/com2
/dev/vme0
/dev/rtc
/dev/ppctb
...
/dev/i2c0/srom/AA
Press <ESC> to Quit, <ENTER> to Continue
```

See Also

3.1.23 diskBoot

Name

diskBoot—boots the specified file from the specified device.

Synopsis

```
diskBoot [-a] [-e] [-f] [-h] [-p] [-v]
```

Parameters

```
-a Ph: Boot File Load Address (Default=Dynamic/User Download Buffer)
-e Ph: Boot File Execution Address Offset (Default = 0)
-f Ps: Boot File Path (Format = Device-Name[\Partition[\File-Name]])
-h 0: Do Not Execute Loaded File
-p Ps: PReP Boot Device Type List (Format Example = Floppy/CDROM/Disk)
-v 0 : Verbose Mode
```

Note When the *-p* option is specified, the values specified by the *-f* option are ignored.

Example

The following example indicates a typical display when using the **diskBoot** command.

```
MOTLoad> diskBoot -f/dev/fd0\l\boot.bin

---the above method can also be accomplished by defining a GEV variable as
follows---
MOTLoad> gevEdit mot-boot-path
(Blank line terminates input.)
/dev/fd0\l\boot.bin

MOTLoad>
```

Error Messages

diskBoot(): device-type list empty/end - exiting

Specified device not found in device table.

diskBoot(): GEV mot-boot-path does not exist

No device specified for boot and one not found in GEV.

No Boot File Path Specified

Boot device not specified nor in GEV.

diskBoot(): partition number reset

Partition number specified not between 0 and 4, reset to 0.

diskBoot(): open(<device>) failed, errno = <value>

Failed to open boot device.

diskBoot(): malloc(<image size>) failed, errno = <value>

Unable to malloc an image-sized buffer.

diskBoot(): unsupported device type

Boot device not disk/floppy/CD-ROM.

diskBoot(): ioctl(103) failed, errno = <value>

Unable to determine device's block size.

diskBoot(): bseek() failed, errno = <value>

Unable to seek to offset specified in device.

diskBoot(): read() failed, status = <value>, errno = <value>

Unable to read from device.

diskBoot(): signature failure - expected= <value>, actual= <value>

BOOT-RECORD block not a PReP/PC type.

diskBoot(): partition table not found

Partition table not found.

diskBoot(): partition not bootable

Partition not bootable.

See Also

netBoot, *tftpGet*

3.1.24 docBoot

Name

docBoot—Boots the kernel image stored in the binary partition of the Disk on Chip (DoC).

Note The DoC binary partitions can be read or programmed only in multiples of their block size. Hence, the size specified should be a multiple of the block size. The block size can be obtained by using the *-v* option. For example, in case of M-System H1 DoC, the block size is 512 KB.

Synopsis

```
docRead [-a] [-d] [-e] [-p] [-s] [-x] [-v]
```

Parameters

```
-a Ph: Boot File Load Address (Default=User Buffer)
-d Ps: DoC Device Name (Default=/dev/doc0)
-e Ph: Boot File Execution Address (Default=0)
-p Ph: Binary Partition Number (Default=0)
-s Ph: Size (Default=12 MB)
-x Ph: Start Block in Current Binary Partition (Default=0)
-v 0: Verbose Mode
```

Example

The following example indicates a typical display when using the **docBoot** command.

```
MOTLoad> docBoot -d/dev/doc0 -a0x8000000 -s0x500000 -x0 -p0 -v1

Found a 1024 MB DiskOnChip on address 0xA0000000
Found a Binary partition with:
 - Partition Size is 41943040
 - Unit size is 524288
Read successful
Section Loaded: Address =01923000, Size =000041FC, Name =.text
Section Loaded: Address =01928000, Size =00288000, Name =.data
Using kernel command line from mot-/dev/doc0-0-boot-
args=console=ttyS1,9600 root =/dev/tffsa1 rw
```

```
loaded at:    01923000 01BB2134
relocated to: 00800000 00A8F134
zimage at:    0080588D 009271EE
initrd at:    00928000 00A8C54F
avail ram:    00400000 00800000

Linux/PPC load: console=ttyS1,9600 root=/dev/tffsa1 rw
Uncompressing Linux...done.
Now booting the kernel
```

3.1.25 docProgram

Name

docProgram—Programs an image residing in the RAM into the binary partition of the DoC.

Note The Disk On Chip (DoC) binary partitions can be read or programmed only in multiples of their block size. Hence, the size specified should be a multiple of the block size. The block size can be obtained by using the *-v* option. For example, in case of M-System H1 DoC, the block size is 512 KB.

Synopsis

```
docProgram [-a] [-d] [-p] [-s] [-x] [-v]
```

Parameters

```
-a Ph: Source Address (Default=User Buffer)
-d Ps: DoC Device Name (Default=/dev/doc0)
-p Ph: Binary Partition Number (Default=0)
-s Ph: Size (Default=12 MB)
-x Ph: Start Block (Default=0)
-v 0 : Verbose Mode
```

Example

The following example indicates a typical display when using the **docProgram** command.

```
MOTLoad> docProgram -d/dev/doc0 -a0x8000000 -s0x500000 -x0 -v1

Found a 1024 MB DiskOnChip on address 0xA0000000
Found a Binary partition with:
 - Partition Size is 41943040
 - Unit size is 524288

Program DoC (Y/N) y
Succeeded in writing 5226496 bytes
MOTLoad>
```

See Also

docRead

3.1.26 docRead

Name

docRead—reads the contents of the specified binary partition into the RAM.

Note The Disk On Chip (DoC) binary partitions can be read or programmed only in multiples of their block size. Hence, the size specified should be a multiple of the block size. The block size can be obtained by using the *-v* option. For example, in case of M-System H1 DoC, the block size is 512 KB.

Synopsis

```
docRead [-a] [-d] [-p] [-s] [-x] [-v]
```

Parameters

```
-a Ph: Load Address (Default=User Buffer)
-d Ps: DoC Device Name (Default=/dev/doc0)
-p Ph: Binary Partition Number (Default=0)
-s Ph: Size (Default=12 MB)
-x Ph: Start Block (Default=0)
-v 0: Verbose Mode
```

Example

The following example indicates a typical display when using the **docRead** command.

```
MOTLoad> docRead -d/dev/doc0 -a0x8000000 -s0x500000 -x0 -v1

Found a 1024 MB DiskOnChip on address 0xA0000000
Found a Binary partition with:
 - Partition Size is 41943040
 - Unit size is 524288
Read successful
MOTLoad>
```

See Also

docProgram

3.1.27 downLoad

Name

downLoad—decodes and downloads an S-Record from the host into the target MOTLoad machine's memory. (Refer to *Using MOTLoad* on page 23.) The serial-port device name (device path file name) can be the full path name to the S-Record. This file in MOTLoad must have read permission enabled.

Note that S-Records cannot be downloaded through the console port.

Synopsis

```
downLoad [-a] [-b] [-d]
```

Parameters

```
-a P*: Destination Memory Address (Default = User Download Buffer)
-b Pd: Baud Rate (Default = 9600)
-d Ps: Device Path Name (Default = /dev/com2)
```

Example

The following example indicates a typical display when using the **downLoad** command.

```
MOTLoad> downLoad
```

Error Messages

downLoad(): open(<port>) failed, errno = <value>

Failed to open port.

downLoad(): ioctl(102) failed, errno = <value>

Failed to set baud rate.

downLoad(): ioctl(100) failed, errno = <value>

Failed to set mode.

See Also

execProgram, *flashProgram*, *upLoad*

3.1.28 ds

Name

ds—provides access to the one-line disassembler. By default, the memory location to disassemble PowerPC assembly instructions is the User Download Buffer.

Synopsis

```
ds [-a] [-n]
```

Parameters

```
-a Ph: Disassembly Address (Default = User Download Buffer)
-n Pd: Number of Instructions (Default = 8)
```

Example

The following example indicates a typical display when using the **ds** command.

```
MOTLoad> ds -a00560000 -n2
00560000 80630000 lwz     r3,0x0(r3)
00560004 00000000 word    0x00000000
```

Error Messages

Assembler Error: error code = <value>

Error code not in table.

Assembler Error: An Operand has a Length of Zero

Self explanatory.

Assembler Error: Unknown Mnemonic

Self explanatory.

Assembler Error: Excessive Operand(s)

Self explanatory.

Assembler Error: Missing Operand(s)

Self explanatory.

Assembler Error: Operand Type Not Found

Self explanatory.

Assembler Error: Operand Prefix

Self explanatory.

Assembler Error: Operand Address Misalignment

Self explanatory.

Assembler Error: Operand Displacement

Self explanatory.

Assembler Error: Operand Sign Extension

Self explanatory.

Assembler Error: Operand Data Field Overflow

Self explanatory.

Assembler Error: Operand Conversion

Self explanatory.

See Also

as, *br*, *gd*, *gn*, *go*, *gt*, *rd*, *rs*, *tc*, *td*

3.1.29 echo

Name

echo—echos a line of text.

Synopsis

echo

Parameters

No parameters

Example

The following example indicates a typical display when using the **echo** command.

```
MOTLoad> echo "this is a test\r\n"
this is a test
MOTLoad>
```

See Also

3.1.30 elfLoader

Name

elfLoader—loads, and attaches if specified, an ELF object to the MOTLoad environment.

Synopsis

```
elfLoader [-a] [-s] [-v]
```

Parameters

```
-a Ph: Load Address of ELF Object File (Default = User Download Buffer)
-s 0: Add Symbols to Dynamic Symbol Table
-v 0: Verbose Mode
```

Example

The following example indicates a typical display when using the **elfLoader** command.

```
MOTLoad> dla = malloc 0x100000
return = 008C0000 (&9175040)
errno = 00000000

MOTLoad> tftpGet -c192.168.1.3 s192.168.1.3 -fperfCode.o -adla
Network Loading from: /dev/enet0
Loading File: perfCode.o
Load Address: 008C0000

Client IP Address = 192.168.1.3
Server IP Address = 192.168.1.33
Gateway IP Address = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0

Network File Load in Progress...

Bytes Received =&2500, Bytes Loaded =&2500
Bytes/Second =&2500, Elapsed Time =1 Second(s)

MOTLoad> elfLoader -adla -s
Section Loaded: Address =009C4000, Size =0000002C, Name =.text
Section Loaded: Address =009C5000, Size =00000014, Name =.rodata
```

```
MOTLoad> testFunction
This is a test
return = 00000010 (&16)
errno = 00000000
MOTLoad
```

Error Messages

elfLoad(): not an ELF file

Specified file not in ELF format.

elfLoad(): processor architecture not supported

ELF file for incompatible processor.

elfLoad(): warning: ELF file must be reloaded to read/write memory

Load failed.

elfLibLoadSections(): malloc() failed

Insufficient memory available.

elfLibLoadSections(): symbol table not found

Symbol table not found for section loaded.

elfLibPatchSections(): load base of section <name> not found

Self explanatory.

elfLibLoadSymbols(): symbol table not found

Self explanatory.

elfLibLoadSymbols(): string table not found

Self explanatory.

elfLibLoadSymbols(): load base of section <name> not found

Symbols reference to unloaded section.

See Also

3.1.31 errorDisplay

Name

errorDisplay—displays the MOTLoad test error status table (log). The error status table contains test error information and task related information from previously executed tests that failed and logged the failure information in the error log. Most of the fields in this table are described below. The user can, through the *-a* option (in hexadecimal values), and the *-n* and *-s* options, (in decimal values), specify which error log entry(ies) to display. In addition to the information below, each error displays a unique test specific message.

Synopsis

```
errorDisplay [-a] [-n] [-s]
```

Parameters

```
-a P*: Executive Process/Task Identifier of Entry to Display
-n P*: Number of Entries to Display
-s P*: Specific Entry Number (1 to n) to Display
```

Field Name	Field Description
sPID	OS Process ID
ePID	Executive Process ID
eS.eM	Executive State.Executive Mode
entryNo	Test task entry number
sErrNo	OS Error number
eErrNo	Executive Error number
errCnt	Test Error count
loopCnt	Test Loop count
sTime	Test Start time
fTime	Test Finish time
eTime	Test Elapsed time
lTime	Time the error was logged

Example

The following example indicates a typical display when using the **errorDisplay** command.

```
MOTLoad> errorDisplay
 tName =testDisk -d/dev/ide0/hdisk -n5000
   sPID=00000011 ePID=00000014  eS.eM = 2.1 entryNo = 00000001
    sErrNo=00000000  eErrNo=0C0002C errCnt=00000001 loopCnt=00000000
   sTime=43:48:15  fTime=43:48:15  eTime=00:00:00 lTime=15:51:54
  Error Messages:
 Data Comparison Failure in Block Range 0-255
  Write/Read Data: 05F0436F/00000000
  Write/Read Address  :  008E1000/00*C0000
  Device-Name = /dev/ide0/hdisk
```

See Also

clear, *testStatus*

3.1.32 eval

Name

eval—evaluates the specified expression using the specified option.

Synopsis

```
eval expression [-a] [-b] [-l] [-o]
```

Parameters

```
-a 0: Display Evaluated Expression in ASCII (if possible)
-b 0: Display Evaluated Expression in Binary (Big-Endian Bit Ordering)
-l 0: Display Evaluated Expression in Binary (Little-Endian Bit Ordering)
-o 0: Display Evaluated Expression in the Octal Number Base
```

Number Base Identifiers	
$	Hexadecimal
&	Decimal
@	Octal
%	Binary
^	ASCII Control
Operators	
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Remainder
^	Raise a Number to a Power
&	Logical AND
|	Logical OR
<<	Left Shift

>>	Right Shift
Modifiers	
-	Negative (2's Complement)
~	1's Complement

Example

The following example indicates a typical display when using the **eval** command.

```
MOTLoad> eval lf678
          0001F678 = $1F678 = &128632
```

Error Messages

expression failed to evaluate

Self explanatory.

See Also

3.1.33 execProgram

Name

execProgram—executes a program that has been downloaded into the memory of a SBC running MOTLoad firmware. This allows the user to run executable programs without having to overwrite any existing programs in the Flash ROM. Immediately prior to transferring control, MOTLoad:
>> disables network interfaces
>> disables all interrupts
>> locks, flushes, invalidates, and disables any enabled caches
>> clears the MPU, MSR register
>> clears the MPU.SPR275 register (ECD pointer)
>> illuminates the board fail light

Synopsis

```
execProgram [-e] [-l] [-s] [-x]
```

Parameters

```
-e Ph: Execution Address Offset (Default = 0)
-l Ph: Load Address (Default = User Download Buffer)
-s Ph: Program/Object Size (Default = 2 MB)
-x Ph: Execution Argument (Default = 0)
```

Example

The following example indicates a typical display when using the **execProgram** command.

```
MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0 -
f/tmp/hxeb100.rom
MOTLoad> execProgram
```

See Also

downLoad

3.1.34 fatDir

Name

fatDir—displays the contents of a device that is formatted with a FAT file system.

Synopsis

```
fatDir [-d] [-f] [-p] [-t]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-f 0: Full Listing
-p Ph: Partition Number (Default = 1)
-t 0: Display Partition-Table/BPB
```

Example

The following example indicates a typical display when using the **fatDir** command.

```
MOTLoad> fatDir
```

Error Messages

fatDir(): partition number out of range

Partition number not between 1 and 4.

fatDir(): fatFsOpen(64) failed

Unable to open FAT file system.

fatDir(): open(<file name>) failed, errno = <value>

Unable to open device/node.

fatDir(): fatFsGetInfo() failed, status = <value>, errno = <value>

Unable to retrieve disk information.

fatDir(): fatFsDirDisplay() failed, status = <value>, errno = <value>

Directory read error.

See Also

fatGet

3.1.35 fatGet

Name

fatGet—copies (GETs) the specified file from a device that is formated with a FAT file system.

Synopsis

```
fatGet [-d] -f [-l] [-p]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-f Ps: File Name
-l Ph: Load Address (Default = User Download Buffer)
-p Pd: Partition Number (Default = 0)
```

Example

The following example indicates a typical display when using the **fatGet** command.

```
MOTLoad> fatGet
```

Error Messages

fatGet(): partition number out of range

Partition number not between 1 and 4.

fatGet(): fatFsOpen(64) failed

Unable to open FAT file system.

fatGet(): malloc() failed

Insufficient free memory for file load cache.

fatGet(): open(<device>) failed, errno = <value>

Unable to open device/node.

fatGet(): fatFsGetInfo() failed, status = <value>, errno = <value>

Unable to read device/node information.

fatGet(): file load failed, status = <value>, errno = <value>

Unable to read file.

See Also

fatDir

3.1.36 fdShow

Name

fdShow—displays the file descriptor table for all MOTLoad configured devices.

Synopsis

```
fdShow [-d]
```

Parameters

```
-d Ps : Device Name
```

Example

The following example indicates a typical display when using the **fdShow** command.

```
MOTLoad> fdShow
Name                        Type     Mode     Argument Count    Priority

/dev/com1                   00000001 00000004 00000000 00000000 FFFFFFFF

Open     Close    Read     Write    IOctl    Specific Link     Position

0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000


Name                        Type     Mode     Argument Count    Priority

/dev/com1                   00000001 00000004 00000000 00000001 FFFFFFFF

Open     Close    Read     Write    IOctl    Specific Link     Position

0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000


Name                        Type     Mode     Argument Count    Priority

/dev/com1                   00000001 00000004 00000000 00000002 FFFFFFFF

Open     Close    Read     Write    IOctl    Specific Link     Position
```

```
0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000

Name                      Type     Mode     Argument Count    Priority
/pipeConsoleI             00000005 00000001 00000000 00000000 00000004
Open     Close    Read     Write    IOctl    Specific Link     Position
0011A834 0011A928 0011A280 0011A438 0011A6CC 0055D000 002B8724 00000000

Name                      Type     Mode     Argument Count    Priority
/pipeConsoleO             00000005 00000002 00000000 00000000 00000004
Open     Close    Read     Write    IOctl    Specific Link     Position
0011A834 0011A928 0011A280 0011A438 0011A6CC 0055F000 002B8764 00000000
```

Error Messages

fdShow(): <file descriptor> not found

Specified file descriptor not found.

See Also

devShow

3.1.37 flashLock

Name

flashLock—sets sector protection on specified flash device on a given Artesyn single-board computer. Protection is set on a per-sector basis on the device's flash ROM as specified by the *-d*, *-n*, and *-o* parameters.

Synopsis

```
flashLock [-d] [-i] [-n] [-o] [-v]
```

Parameters

```
-d Ps : Flash Memory Device Name (Default = /dev/flash0)
-i 0  : Disable Interactive Confirmation
-n Ph : Number of Bytes to Lock (i.e., protect)
-o Ph : Offset Address of Flash Memory (Default = $00000000)
-v Ph  : Verbose Mode
```

Example

The following example indicates a typical display when using the **flashLock** command.

```
MOTLoad> flashLock -d/dev/flash0 -n80000 -o01000000 -v
Flash Memory Starting/Ending Addresses =F9000000/F907FFFF
Number of Effective Bytes               =00080000 (&524288)

Lock/Protect Flash Memory Sector(s) (Y/N)? Y

Virtual-Device-Number   =0000
Manufacturer-Identifier =0001
Device-Identifier       =227E
Secondary-Identifier    =2223
Virtual-Device-Number   =0001
Manufacturer-Identifier =0001
Device-Identifier       =227E
Secondary-Identifier    =2223
Address-Mask            =F8000000
MOTLoad>
```

Note

1. Size option (*-n*) is specified in bytes. Devices typically set protection at the sector level. Minimum number of bytes that are set is determined by sector size and Flash configuration.
2. Since not all Flash devices support a software protection mechanism, not all MOTLoad products include the command

Error Messages

flashLock(): open(<device>) failed, errno = <value>

Unable to open specified Flash device.

flashLock(): ioctl(101) failed, errno = <value>

Unable to read Flash configuration.

flashLock(): ioctl(104) failed, errno = <value>

Unable to invoke Flash driver.

Flash Memory PreProgramming Error: Address-Alignment

Flash addresses not aligned.

Flash Memory PreProgramming Error: Address-Range

Flash addresses out of range.

Flash Memory PreProgramming Error: Unexpected-Manufacturer-Identifier

Manufacturer ID not as expected.

Flash Memory PreProgramming Error: Unexpected-Device-Identifier

Device identifier not as expected.

Flash Memory Programming Error: Lock-Protected-Sector(s)-Detected

Unlockable Sector(s) Detected.

Flash Memory Programming Error: Protection-Clear-Phase_Time_Out

Time out during protection set/clear phase.

See Also

flashProgram, *flashShow*, *flashUnlock*

3.1.38 flashProgram

Name

flashProgram—flashes an image into the specified Flash device on a given Artesyn single board computer. The image is flashed (written) into the device's flash ROM as specified by the *-d*, *-n*, and *-s* parameters.

Synopsis

```
flashProgram [-d] [-i] [-n] [-o] [-s] [-v]
```

Parameters

```
-d Ps : Flash Memory Device Name (Default = /dev/flash0)
-i 0  : Disable Interactive Confirmation
-n Ph : Number of Bytes to Program (Default = $00100000)
-o Ph : Offset Address of Flash Memory (Default = $00000000)
-s Ph : Source Address (Default = User Download Buffer)
-v 0  : Verbose Mode
```

Example

The following example indicates a typical display when using the **flashProgram** command.

```
MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0 -
f/tmp/hxeb100.rom
MOTLoad> flashProgram -d/dev/flash0 -o0010000 -n00100000
```

Error Messages

flashProgram(): open(<device>) failed, errno = <value>

Unable to open specified Flash device.

flashProgram(): ioctl(101) failed, errno = <value>

Unable to read Flash configuration.

flashProgram(): ioctl(100) failed, errno = <value>

Unable to invoke Flash driver.

Flash Memory PreProgramming Error: Address-Alignment

Flash addresses not aligned.

Flash Memory PreProgramming Error: Address-Range

Flash addresses out of range.

Flash Memory Programming Error: Unexpected-Manufacturer-Identifier

Manufacturer ID not as expected.

Flash Memory Programming Error: Unexpected-Device-Identifier

Device identifier not as expected.

Flash Memory Programming Error: Zero-Phase

Flash device not responsive.

Flash Memory Programming Error: Erase/Write-Phase_Voltage-Level

Flash device wouldn't program.

... Erase-Phase

Error occurred in erase phase.

... Write-Phase

Error occurred during write phase.

... Erase-Phase_Time-Out

Time out during erase phase.

... Write-Phase_Time-Out

Time out during Flash write.

... Verify-Phase

Error occurred during verify phase.

See Also

downLoad, *flashShow*

3.1.39 flashShow

Name

flashShow—displays all MOTLoad configured Flash devices.

Synopsis

```
flashShow -d
```

Parameters

```
-d Ps: Device Name (Default = All Flash Memory Devices)
```

Example

The following example indicates a typical display when using the **flashShow** command.

```
MOTLoad> flashShow
Device-Name Base-Address,Size    Device-Size,Count     Boot Type

/dev/flash0     F2000000,02000000 01000000,00000002 Yes   Intel 28F128

/dev/flash1    FF800000,00200000 00080000,00000004 No    AMD 29LV040
```

Error Messages

open() on "<device>" failed, errno <value>

Unable to open Flash device node.

ioctl(101) on "<device>" failed, errno = <value>

Unable to read Flash memory configuration.

See Also

flashProgram

3.1.40 flashUnlock

Name

flashUnlock—clears sector protection on specified Flash device on a given Artesyn single-board computer. Protection is set on a per-sector basis on the device's Flash ROM as specified by the *-d*, *-n*, and *-o* parameters.

Synopsis

```
flashUnlock [-d] [-i] [-n] [-o] [-v]
```

Parameters

```
-d Ps : Flash Memory Device Name (Default = /dev/flash0)
-i 0  : Disable Interactive Confirmation
-n Ph : Number of Bytes to Unlock
-o Ph : Offset Address of Flash Memory (Default = $00000000)
-v Ph  : Verbose Mode
```

Example

The following example indicates a typical display when using the **flashUnlock** command.

```
MOTLoad> flashUnlock -d/dev/flash0 -n80000 -o01000000 -v
Flash Memory Starting/Ending Addresses =F9000000/F907FFFF
Number of Effective Bytes               =00080000 (&524288)

Unlock/Unprotect Flash Memory Sector(s) (Y/N)?
Virtual-Device-Number=0000
Manufacturer-Identifier=0001
Device-Identifier=227E
Secondary-Identifier=2223
Virtual-Device-Number=0001
Manufacturer-Identifier=0001
Device-Identifier=227E
Secondary-Identifier=2223
Address-Mask=F8000000
Flash Memory Sector Unlock Complete
MOTLoad>
```

Notes

1. Size option (*-n*) is specified in bytes. Devices typically set protection at the sector level. Minimum number of bytes that are set to unprotected is determined by sector size and Flash configuration.
2. Since not all Flash devices support a software protection mechanism, not all MOTLoad products include the command.

Error Messages

flashUnlock(): open(<device>) failed, errno = <value>

Unable to open specified Flash device.

flashUnlock(): ioctl(101) failed, errno = <value>

Unable to read Flash configuration.

flashUnlock(): ioctl(104) failed, errno = <value>

Unable to invoke Flash driver.

Flash Memory PreProgramming Error: Address-Alignment

Flash addresses not aligned.

Flash Memory PreProgramming Error: Address-Range

Flash addresses out of range.

Flash Memory PreProgramming Error: Unexpected-Manufacturer-Identifier

Manufacturer ID not as expected.

Flash Memory PreProgramming Error: Unexpected-Device-Identifier

Device identifier not as expected.

Flash Memory Programming Error: Lock-Protected-Sector(s)-Detected

Unlockable Sector(s) Detected.

Flash Memory Programming Error: Protection-Clear-Phase_Time_Out

Time out during protection set/clear phase.

See Also

flashLock, *flashProgram*, *flashShow*

3.1.41 gd

Name

gd—directly executes the user-program, bypassing any break-point previously defined.

Synopsis

```
gd -a
```

Parameters

```
-a Ph: Address
```

Example

The following example indicates a typical display when using the **gd** command.

```
MOTLoad> gd
```

See Also

gn, *go*, *gt*

3.1.42 gevDelete

Name

gevDelete—deletes a MOTLoad global environment variable.

Synopsis

```
gevDelete name
name is the name of the MOTLoad global variable to be deleted
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevDelete** command.

```
MOTLoad> gevDelete mot-boot-path
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run **getInit** to correct.

Can not find variable by that name

GEV not found.

Variable is multiply defined, only the first definition will be deleted

Self explanatory.

See Also

gevDump, *gevEdit*, *gevInit*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.43 gevDump

Name

gevDump—displays (dump) the values of the MOTLoad global environment variables from NVRAM in a hex dump format.

Synopsis

```
gevDump
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevDump** command.

```
MOTLoad> gevDump
 0000  00 00 03 00 00 00 00 01  40 08 00 20 00 00 00 00  ........@.. ....

0010  00 00 00 00 00 00 80 00  00 80 00 00 04 00 00 00  ................

0020  00 00 20 10 00 00 00 01  00 00 00 00 40 00 00 00  .. .........@...

0030  00 02 00 11 00 01 00 00  40 01 00 00 00 00 00 00  ........@.......

0040  14 00 00 00 00 00 00 00  02 00 42 01 00 00 00 00  ..........B.....

 .

 .

 .

00C0  01 01 00 00 09 00 00 00  00 40 00 00 04 00 40 04  .........@....@.

00D0  00 00 00 00 00 00 00 00  00 08 08 C0 00 00 00 80  ................

00E0  40 00 00 80 01 00 20 00  00 00 00 00 00 00 0A 42  @..... ........B

00F0  00 00 00 20 24 00 00 00  10 04 01 10 20 00 00 00  ... $....... ...
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run **gevInit** to correct.

See Also

gevDelete, *gevEdit*, *gevInit*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.44 gevEdit

Name

gevEdit—creates and modifies (edits) a MOTLoad environment variable.

Synopsis

```
gevEdit name
name is the name of the MOTLoad global variable to be edited
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevEdit** command.

```
MOTLoad> gevEdit mot-boot-path
(Blank line terminates input.)
/dev/fd0[\l[\\boot.bin]]

MOTLoad>
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run **gevInit** to correct.

See Also

gevDelete, *gevDump*, *gevInit*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.45 gevInit

Name

gevInit—initializes (clears) the MOTLoad global environment variable area in NVRAM.

Synopsis

```
gevInit
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevEdit** command.

```
MOTLoad> gevInit

Update Global Environment Area of NVRAM (Y/N)? y
Warning: This will DELETE any existing Global Environment Variables!
Continue? (Y/N)? y
MOTLoad>
```

Error Messages

PReP NVRAM header test failed

Corrupted GEV area.

See Also

gevDelete, *gevDump*, *gevEdit*, *gevList*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.46 gevList

Name

gevList—lists by name the global environment variable labels currently defined.

Synopsis

```
gevList
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevList** command.

```
MOTLoad> gevList

Total Number of GE Variables =0, Bytes Utilized =0, Bytes Free =3592
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run **gevInit** to correct.

See Also

gevDelete, *gevDump*, *gevEdit*, *gevInit*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.47 gevShow

Name

gevShow—displays the name(s) and value(s) of the MOTLoad global environment variable(s) that are contained in the NVRAM. If the optional [*name*] argument is omitted, all the environment variables are shown.

Synopsis

```
gevShow
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevShow** command.

```
MOTLoad> gevShow
mot-boot-path=/dev/fd0[\l[\\boot.bin]]
Total Number of GE Variables =1, Bytes Utilized =39, Bytes Free =2273
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run **getInit** to correct.

See Also

gevDelete, *gevDump*, *gevEdit*, *gevShow*

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.48 gn

Name

gn—executes the user-program, stopping on the next instruction.

Synopsis

```
gn
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gn** command.

```
MOTLoad> gn
```

See Also

gd, *go*, *gt*

3.1.49 go

Name

go—starts the execution of the user-program.

Synopsis

```
go -a
```

Parameters

```
-a Ph: Address
```

Example

The following example indicates a typical display when using the **go** command.

```
MOTLoad> go
```

See Also

gd, *gn*, *gt*, *td*, *tc*

3.1.50 gt

Name

gt—starts the execution of the user-program to its temporary break-point.

Synopsis

```
gt -a [-c]
```

Parameters

```
-a Ph: Address
-c Pd: Count (Default = 0)
```

Example

The following example indicates a typical display when using the **gt** command.

```
MOTLoad> gt -a73FC88
```

See Also

gd, *go*, *gn*

3.1.51 hbd

Name

hbd—displays the contents of the command-line history buffer. By default all entries are displayed. Optionally, the user can display a specified number of the most recent entries. Currently, the command-line history buffer limit is 128 entries.

Synopsis

```
hbd [-n]
```

Parameters

```
-n Ph: Number of Entries to Display
```

Example

The following example indicates a typical display when using the **hbd** command.

```
MOTLoad> hbd
1 help
2 help help
3 help taskActive
4 help clear
5 help taskActive errorDisplay
6 help
7 help hbd
8 taskActive -a
9 test8
10 hbd

MOTLoad> hbd -n3
19 testStatus
20 hbd
21 hbd -n3
```

See Also

clear, *hbx*

3.1.52 hbx

Name

hbx—executes the specified command-line history buffer entry.

Synopsis

```
hbx -n
```

Parameters

```
-n Pd: Number of the Entry to Execute
```

Example

The following example indicates a typical display when using the hbx command.

```
MOTLoad> hbd
1 help
2 help help
3 help taskActive
4 help clear
5 help taskActive errorDisplay
6 help
7 help hbd
8 taskActive -a
9 test8
10 hbd
11 help testSuite
12 testSuite -nait

MOTLoad> hbx -n12
MOTLoad> testSuite -nait
```

See Also

clear, *hbd*

3.1.53 help

Name

help—displays the help information about MOTLoad tests and utilities. The command can be used several ways. When used by itself, a display of all available commands (for that product) with a brief command description is shown. When used with a resolvable command name(s) argument, the specified command(s) with the command-line syntax and a brief description of each command argument/option is/are displayed. If the command name argument cannot be resolved an error message ("ambiguous") is displayed. If the optional '/' precedes a partial command string (pattern), all commands beginning with that string are listed. If no command matches the pattern, nothing is displayed.

Synopsis

```
help [commands...]|[/pattern]|[?]
```

Parameters

```
commands - any one (or more) of the available commands
/pattern - list all commands beginning with pattern
? - list command names only and in multi-column format
```

Example

The following example indicates a typical display when using the **help** command.

```
MOTLoad> help
clear         Clear the Specified Table(s)
errorDisplay Display the Contents of the Test Error Status Table
eval          Evaluate Expression
help          Display Command/Test Help Strings
hbd           Display History Buffer
hbx           Execute History Buffer Entry
reset         Reset System
taskActive    Display the Contents of the active Task Table
testSuite     Executive Test Suite
testStatus    Display the Contents of the Test Status Table
version       Display Version String(s)
```

```
MOTLoad>help /testSu
testSuite     Execute Test Suite
testSuiteMake Make (Create/Modify) Test Suite
MOTLoad>
```

See Also

3.1.54 l2CacheShow

Name

l2CacheShow—displays L2 Cache State and Control Register contents.

Synopsis

```
l2CacheShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **l2CacheShow** command.

```
MOTLoad> l2CacheShow
MPU-Int Cache(L2) =256K, Enabled, L2CR:0xC0000000
```

Error Messages

Some versions of MOTLoad may not display this error message:

WARNING: Missing VPD packet for L2 cache!

VPD packet describing L2 not found.

See Also

l3CacheShow

3.1.55 l3CacheShow

Name

l3CacheShow—displays L3 Cache State and Control Register contents.

Synopsis

```
l3CacheShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **l3CacheShow** command.

```
MOTLoad> l3CacheShow
MPU-Ext Cache(L3) =2M, Enabled, L3CR:0xDF838000
```

Error Messages

Some versions of MOTLoad may not display this error message.

WARNING: Missing VPD packet for L3 cache!

VPD packet describing L3 not found.

See Also

l2CacheShow

3.1.56 mdb mdh mdw

Name

mdb, **mdh**, **mdw**—displays the contents of a memory block as specified by the command-line options.

Synopsis

```
mdb/mdh/mdw -a [-c] [-s]
```

Parameters

```
-a Ph : Starting Address
-c Ph : Number of Elements to Display
-s 0 : Byte Swap
```

Example

The following example indicates a typical display when using the **mdb**, **mdh**, or **mdw** commands.

```
MOTLoad> mdw -a00560000 -c8
00560000  00000000  00000000  00000000  00000000 ........
00560010  00000000  00000000  00000000  00000000 ........

MOTLoad> mdh -a00560000 -c10
00560000  0000 0000 0000 0000 0000 0000 0000 0000 .......
00560000  0000 0000 0000 0000 0000 0000 0000 0000 .......

MOTLoad> mdb -a00560000 -c20
00560000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ..
00560000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ..
```

See Also

mmb mmh mmw

3.1.57 memShow

Name

memShow—displays the current memory that is free and that is allocated.

Synopsis

```
memShow [-d]
```

Parameters

```
-d 0: Displays Allocated Blocks in Detail
```

Example

The following example indicates a typical display when using the **memShow** command.

```
MOTLoad> memShow
Current Allocated/Free Memory Statistics:
Total Size of Memory........10000000 (&268435456)
Free........................OD742000 (&225714176)
Allocated...................024BE000 (&38526976)
Average Block Size..........00027311 (&160529)
Maximum Block Size..........02000000 (&33554432)
Minimum Block Size..........00001000 (&4096)
Number of Blocks............000000F0 (&240)
Largest Free Block Size.....0C000000 (&201326592)
Largest Free Block Address..04000000:0FFFFFFF
Reserved Block Address......00000000L003FFFFF
User Buffer/Block Address...00560000:0075FFFF
```

See Also

3.1.58 mmb mmh mmw

Name

mmb, **mmh**, **mmw**—modifies the contents of a memory block as specified by the command-line options. To terminate modifications, enter a period (".").

Synopsis

```
mmb/mmh/mmw -a [-i] [-n] [-s]
```

Parameters

```
-a Ph : Starting Address
-i Pd : Number of Elements to Increment
-n 0  : Disable Read/Verify
-s 0  : Byte Swap
```

Example

The following example indicates a typical display when using the **mmb**, **mmh**, and **mmw** commands.

```
MOTLoad> mmw -a00560000
00560000 00002341? 12345678
00560004 00001324? 87654321
00560008 00000000? .
MOTLoad>

MOTLoad> mmh -a00560000
00560000 1234? 3333
00560002 5678? 2222
00560004 8765? .
MOTLoad>

MOTLoad> mmb -a00560000
00560000 33? 55
00560001 33? 66
00560002 22? .
MOTLoad>
```

See Also

mdb mdh mdw

3.1.59 mpuFork - Fork Idle MPU

Name

mpuFork—issues an execution command to an idle processor allowing it to begin executing target code at the address specified by the -a option. Results will depend on board configuration and the presence of an idle processor. Before execution begins, the value specified by the -b option is loaded into processor register r3. The execution address must not be zero and an MPU must be in the idle state in order to accept this command. This command is for multi-processor boards only.

Note Not applicable to single core products. To inquire about idle processors, refer to the **mpuShow** command.

Synopsis

```
mpuFork [-a] [-b]
```

Parameters

```
-a Ph: Memory Address (Default = User Download Buffer)
-b Ph: Argument Data For R3 (Default = 0)
```

Example

The following example indicates a typical display when using the **mpuFork** command.

Example 1: Executing a program loaded at address 0x00001000

```
MOTLoad> mpuFork -a1000 -b12341234
MPU 0 is to begin execution at 00001000 with 12341234 in r3
Correct (Y/N)? n
MOTLoad>
```

Example 2: Executing a program loaded at an address where memory has been allocated to the label "mputest".

```
MOTLoad> mputest = malloc 1000
```

Next, create or load a program to "mputest" area by any means. Passing the programs own starting address in the register r3.

```
MOTLoad> mpuFork -amputest -bmputest
MPU 0 is to begin execution at 00A73000 with 00A73000 in r3
Correct (Y/N)? y
Command Issued. . . Accepted.
MOTLoad>
```

Example 3: Zero is not allowed as an execution address.

```
MOTLoad> mpuFork -a0 -b12341234
ERROR Invalid Execution Address.
MOTLoad>
```

Example 4: If there is not a processor in the idle state.

```
MOTLoad> mpuFork -amputest -bmputest
Cannot Find An Idle MPU.
MOTLoad>
```

See Also

mpuShow, **mpuStart**

3.1.60 mpuShow - Display MPU Configuration

Name

mpuShow—Displays the multi-processor control structure which holds current status information for each MPU.

Synopsis

```
mpuShow
```

Note: Not applicable to single core products.

Parameters

No parameters

Example

The following example indicates a typical display when using the **mpuShow** command.

```
MOTLoad> mpuShow
MPU   mMpuCt1  login cmdip    cmdid     cmdarg
0     0000A2C8 MAST 00000000 00000000 00000000
1     0000A2D8 IDLE 00000000 00000000 00000000

MOTLoad> mpuShow
MPU    mMpuCt1 login cmdip    cmdid     cmdarg
0     0000A2C8 MAST 00000000 00000000 00000000
1     0000A2D8 IDLE 00000000 00000000 00000000

MOTLoad> mpuShow
MPU    mMpuCt1 login cmdip    cmdid     cmdarg
0     0000A2C8 EXEC 00000000 00000000 00000000
1     0000A2D8 MAST 00000000 00000000 00000000
```

See Also

mpuFork, **mpuStart**

3.1.61 mpuStart - Start the Other MPU

Name

mpuStart—Begin execution of second CPU core. Upon completion of mpuStart, second CPU will be in the idle state.

Synopsis

```
mpuStart
```

Note: Not applicable to single core products.

Parameters

The following example indicates a typical display when using the **mpuStart** command.

```
MOTLoad > mpuStart
```

See Also

mpuFork, **mpuShow**

3.1.62 netBoot

Name

netBoot—performs various network boot functions.

Synopsis

```
netBoot
  Boot File : [-a] [-e] -f [-l] [-o]
  IP Address: [-b] [-c] [-g] [-m] [-s]
  BOOT/RARP : [-p] [-u]
  General   : [-d] [-h] [-n] [-r] [-v] [-z]
```

Parameters

```
-a Ph: Boot File Load Address (Default=Dynamic/User Download Buffer)
-b Ps: Broadcast IP Address (Default=255.255.255.255)
-c Ps: Client IP Address (Default = 0.0.0.0.)
-d Ps: Device Name (Default=/dev/enet0)
-e Ph: Boot File Execution Address Offset (Default = 0)
-f Ps: Boot File Name
-g Ps: Gateway IP Address (Default = n.n.n.253)
-h 0 : Do Not Execute Loaded File
-l Ph: Boot File Length (Default = Entire File)
-m Ps: Subnet Mask (Default = 255.255.255.0)
-n 0 : Non-interactive mode
-o Ph: Boot File Offset (Default = 0)
-p 0 : BOOTP/RARP Request Force (Default = When Needed)
-r Pd: Retry Count (Default = Forever)
-s Ps: Server IP Address (Default = 0.0.0.0)
-u 0 : BOOTP/RARP Replay Configuration Update Disable (Default=Yes)
-v 0 : Verbose Mode
-z 0 : PReP Mode
```

Example

The following example indicates a typical display when using the **netBoot** commands.

```
MOTLoad> netBoot -d/dev/enet0 -f/directory/file.o -c144.191.16.99
MOTLoad. -s144.191.11.33 -g144.191.16.253

Network Loading from: /dev/enet0

Client IP Address      = 144.191.16.99
Server IP Address      = 144.191.11.33
Gateway IP Address     = 144.191.16.253
Subnet IP Address Mask = 255.255.255.0
Boot File Name         = /directory/file.o
Load Address           = 02000000


Network Boot File Load Start - Press <ESC> to Bypass, <SPC> to Continue.

Network Boot File Load in Progress - Press <CTRL-C> to Abort

Bytes Received =&1048576, Bytes Loaded =&1048576
Bytes Received =&209715, Elapsed Time =5 Second(s)


Moving File/Image to User Download Buffer (00710000)


Boot Device       =/dev/enet0
Boot File         =/directory/file.o
Load Address      =00710000
Load Size         =00100000
Execution Address =00710000
Execution Offset  =00000000


Passing control to the loaded file/image.
```

Error Messages

networkBoot(): malloc(<size>) failed, errno = <value>

Unable to allocate memory for download (max 32 MB).

networkBoot(): illegal IP address

An IP address is invalid.

networkBoot(): open(<device>) failed, errno = <value>

Unable to open Ethernet port.

Locating BOOTP Server... Error Status: <value>

Unable to locate specified server.

Error Status: <value>

TFTP load failed.

Network I/O Error Codes

0x01	TFTP retry count exceeded
0x02	BOOTP retry count exceeded
0x03	User abort, break key depressed
0x04	Timeout expired
0x05	DHCP retry count exceeded

See Also

netShow, *netShut*, *netStats*, *tftpGet*

3.1.63 netShow

Name

netShow—displays all MOTLoad configured network devices.

Synopsis

```
netShow [-d]
```

Parameters

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netShow** commands.

```
MOTLoad> netShow
Interface       EAddress       Status  Speed  Duplex
/dev/enet0    0001AF07C491  Up     10MBS Half
```

Error Messages

open() failed, errno = <value>

Unable to open network device.

ioctl(121) failed, errno = <value>

Unable to read Ethernet (MAC) address of device.

ioctl(127) failed, errno = <value>

Unable to determine link status.

ioctl(128) failed, errno = <value>

Unable to determine link speed.

ioctl(129) failed, errno = <value>

Unable to determine half/full duplex.

See Also

netBoot, *netShut*, *netStats*, *tftpGet*

3.1.64 netShut

Name

netShut—disables a MOTLoad configured network device.

Synopsis

```
netShut [-d]
```

Warning

Exercise caution when using this command. A board reset is the only way to reactivate the network interface, and some errors messages may result in the meantime, if any operations take place while the network is disabled.

Parameters

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netShut** commands.

```
MOTLoad> netShut
/dev/enet0    Disabled
```

Error Messages

open() failed, errno = <value>

Device improperly opened.

ioctl(123) failed, errno = <value>

Device reset failed.

See Also

netBoot, *netShow*, *netStats*, *tftpGet*

3.1.65 netStats

Name

netStats—displays the network statistics for a MOTLoad configured network device.

Synopsis

```
netStats [-d]
```

Parameter

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netStats** commands.

```
MOTLoad> netStats
Interface    TX-Frames=Okay:Error          RX-Frames=Okay:Error
/dev/enet0              0:0                          0:0
```

Error Messages

open() failed, errno = <value>

Device failled to open.

ioctl(102) failed, errno = <value>

Unable to retrieve RxD count.

ioctl(103) failed, errno = <value>

Unable to retrieve TxD count.

ioctl(104) failed, errno = <value>

Unable to retrieve RxD error count.

ioctl(105) failed, errno = <value>

Unable to retrieve TxD error count.

See Also

netBoot, *netShow*, *netShut*, *tftpGet*

3.1.66 noCm

Name

noCm—turns off the concurrent mode.

Synopsis

```
noCm
No argument description
```

Parameter

No parameters

Example

The following example indicates a typical display when using the **noCm** commands.

```
MOTLoad> noCm
Concurrent Mode Terminated
```

See Also

cm

3.1.67 pciDataRd

Name

pciDataRd—reads and displays the PCI configuration header register contents of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDataRd [-b] [-d] [-f] [-i] [-o] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Ps: Device Name (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-o Ph: Offset (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
```

Example

The following example indicates a typical display when using the **pciDataRd** commands.

```
MOTLoad> pciDataRd  -il  -b0  -dZ  -f0  -o0 -x4
Read Data =10088086
```

See Also

pciDataWr, *pciDump*, *pciShow*, *pciSpace*

3.1.68 pciDataWr

Name

pciDataWr—writes a data value to the PCI configuration header register of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDataWr [-b] [-d] [-f] [-i] [-o] [-x] [-z]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-o Ph: Offset (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
-z Ph: Data to Write
```

Example

The following example indicates a typical display when using the **pciDataWr** commands.

```
MOTLoad> pciDataRd  -il  -b0  -dZ  -f0  -o0 -x4
Read Data =02300007

MOTLoad>pciDataWr -il -b0 -d2 -f0 0o4 -x4 -z0

MOTLoad>pciDataRd -il -b0 -d2 -f0 -o4 -x4
Read Data =02300000
```

See Also

pciDataRd, *pciDump*, *pciShow*, *pciSpace*

3.1.69 pciDump

Name

pciDump—dumps (displays) the PCI configuration header register contents of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDump [-b] [-d] [-f] [-i] [-n] [-s] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-n Ph: Number of Elements (Default = 64)
-s Pd: Starting Offset: (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
```

Example

The following example indicates a typical display when using the **pciDump** commands.

```
MOTLoad> pciDump  -il  -b0  -dZ  -f0  -n4 -x4
0000  02300000 02000002 00008008 B1100000    .0...........
```

See Also

pciDataRd, *pciDataWr*, *pciShow*, *pciSpace*

3.1.70 pciShow

Name

pciShow—displays the entire PCI configuration header register contents of each PCI device, as specified by the command line arguments.

Synopsis

```
pciShow [-b] [-d] [-f] [-i] [-n] [-s] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-m 0 : Multi-Function Device Rule Mode
-p 0 : Probe
-s 0 : Short Display Mode
```

Note **pciShow** without any parameters displays the PCI configuration header register contents of each on-board PCI device only. On-board PCI devices include PCI controllers and PCI-to-PCI bridges that statically reside on the PCI bus(es) of the baseboard. **pciShow** with the –p parameter causes MOTLoad to probe the PCI bus(es) and displays the PCI configuration header register contents of all PCI devices, which include on-board PCI devices and external PCI devices that are located on a PMCSpan and/or PMC site.

Example

The following example indicates a typical display when using the **pciShow** commands.

```
MOTLoad> pciShow
Instance/Bus/Device/Function:   00 00 06 00
Vendor/Device Identifier : 8086 B154
Class      : 06 Bridge Controller/Device
Sublcass   : 04 PCI-to-PCI Bridge
0000 80 86 B1 54 00 07 02 B0 00 00 04 06 08 80 01 00 ...T..
```

```
0010 00 00 00 00 00 00 00 00 00 01 01 80 91 A1 22 A0 ..."..
0020 80 90 80 90 FF F1 00 01 FF FF FF FF 00 00 00 00 ......
0030 00 00 00 00 DC 00 00 00 00 00 00 00 00 00 00 00 ......
```

See Also

pciDataRd, *pciDataWr*, *pciDump*, *pciSpace*

3.1.71 pciSpace

Name

pciSpace—displays the PCI I/O and memory space allocation for all MOTLoad configured PCI devices.

Synopsis

```
pciSpace
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **pciSpace** commands.

```
MOTLoad>
Device 00.00.00.00  Range 01000000:010FFFFF  32-Bit Memory
Device 01.00.02.00  Range 00010000:00010FFF  32-Bit I/O
Device 01.00.04.00  Range 00011000:00011FFF  32-Bit I/O
Device 01.00.04.01  Range 00012000:00012FFF  32-Bit I/O
Device 01.00.00.00  Range 01000000:010FFFFF  32-Bit Memory
Device 01.00.02.00  Range 01100000:0111FFFF  32-Bit Memory
Device 01.00.02.00  Range 01120000:0113FFFF  32-Bit Memory
Device 01.00.04.00  Range 01140000:01140FFF  32-Bit Memory
Device 01.00.04.00  Range 01142000:01143FFF  32-Bit Memory
Device 01.00.04.01  Range 01141000:01141FFF  32-Bit Memory
Device 01.00.04.01  Range 01144000:01145FFF  32-Bit Memory
Device 01.01.07.00  Range 00009000:0000900F  16-Bit I/O
Device 01.01.07.00  Range 00009010:0000901F  16-Bit I/O
Device 01.01.07.00  Range 00009020:0000902F  16-Bit I/O
Device 01.01.07.00  Range 00009030:0000903F  16-Bit I/O
Device 01.01.07.00  Range 00009040:0000904F  16-Bit I/O
Device 01.01.06.00  Range 00900000:00900FFF  32-Bit Memory
Device 01.01.06.01  Range 00901000:00901FFF  32-Bit Memory
Device 01.01.06.02  Range 00902000:00902FFF  32-Bit Memory
```

Error Messages

Invalid Space Record - Null Pointer

Self explanatory.

See Also

pciDataRd, *pciDataWr*, *pciDump*, *pciSpace*

3.1.72 ping

Name

ping—broadcasts a generic network packet to a specified server (host).

Synopsis

```
ping -c [-d] [-n] [-p] [-r] -s [-t] [-s]
```

Parameters

```
-c Ps: Client IP Address
-d Ps: Device Name (Default =/dev/enet0)
-n Pd: Packet Count (Default = 1)
-p Pd: Packet-To-Packet Delay Count (Default - 1 Second)
-r Pd: Retry Count (Default = Forever)
-s Ps: Server (Host to Ping) IP Address
-t Pd: Time-Out Delay Count (Default = 10 Seconds)
-s Pd: Packet Size (Default = 128 Bytes/Octets)
```

Example

The following example indicates a typical display when using the **ping** commands.

```
MOTLoad> ping -c192.168.1.16.3 -s192.168.1.253
Client (Source) IP Address      = 192.168.1.3
Server (Destination) IP Address = 192.168.1.253
Server/Host Found, E-Address    = 00E04FD04940
170 (128+42) bytes from 192.168.1.253: icmp_seq=0 time=114216 us
Packets Transmitted =1, Packets Received =1, Packets Lost =0 (0%)
Round-Trip Min/Avg/Max = 114216/114216/114216 uS
```

Error Messages

pingHost(): illegal IP address

Invalid host/client IP address.

pingHost(): open(<device>) failed, errno = <value>

Failed to open Ethernet device.

Network I/O Error Codes

0x01	TFTP retry count exceeded
0x02	BOOTP retry count exceeded
0x03	User abort, break key depressed
0x04	Timeout expired
0x05	DHCP retry count exceeded

See Also

tftpGet, *tftpPut*

3.1.73 portSet

Name

portSet—sets the communication mode(s) for a serial port.

Synopsis

```
portSet [-b] [-d] [-p] [-s] [-w]
```

Parameters

```
-b Pd: Baud Rate (Default = 9600)
-d Ps: Serial-Port Device Name (Default = /dev/com2)
-p Ps: Parity (e/o) (Default = No)
-s Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the **portSet** commands.

```
MOTLoad> portSet -b14400 -d/dev/com2
```

Error Messages

portSet(): open(<device>) failed, errno <value>

Unable to open specified port.

portSet(): ioctl(101) failed, errno = <value>

Unable to get port's current mode.

portSet(): ioctl(100) failed, errno = <value>

Unable to set port's configuration.

portSet(): ioctl(102) failed, errno = <value>

Unable to set port's baud rate.

portSet(): ioctl(122) failed, errno = <value>

Unable to flush port's read data buffers.

portSet(): ioctl(123) failed, errno = <value>

Unable to flush port's write data buffers.

portSet(): error, not a tty

Specified device is not a tty.

See Also

3.1.74 portShow

Name

portShow—displays the configuration of all detected serial ports. Information on baud rate, length, number of stop bits, parity, and port usage is provided. The possible usage types are:
I - Standard Input
O - Standard Output
E - Standard Error

Synopsis

```
portShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **portShow** command.

```
MOTLoad> portShow
Port-Device  Baud-Rate  Length  Stop-Bits Parity Usage
/dev/com1       9600       8       1        None  IOE
/dev/com2       9600       8       1        None
/dev/com3       9600       8       1        None
/dev/com4       9600       8       1        None
```

See Also

portSet

3.1.75 rd

Name

rd—displays the contents of the PowerPC register set.

Synopsis

```
rd [-n]
```

Parameters

```
-n Ps: Register Name
```

Example

The following example indicates a typical display when using the **rd** commands.

```
MOTLoad> rd
ip  =00560000  msr =0000B030  cr  =00000000  xer =00000000
r0  =00000000  r1  =00760000  r2  =00000000  r3  =00000000
r4  =00000000  r5  =00000000  r6  =00000000  r7  =00000000
r8  =00000000  r9  =00000000  r10 =00000000  r11 =00000000
r12 =00000000  r13 =00000000  r14 =00000000  r15 =00000000
r16 =00000000  r17 =00000000  r18 =00000000  r19 =00000000
r20 =00000000  r21 =00000000  r22 =00000000  r23 =00000000
r24 =00000000  r25 =00000000  r26 =00000000  r27 =00000000
r28 =00000000  r29 =00000000  r30 =00000000  r31 =00000000
lr  =00000000  ctr =00000000  tbu =00000000  tbl =00000000
00560000 00000000  word        0x00000000

MOTLoad> rd -nr3
r3  =00000000
```

See Also

rs

3.1.76 reset

Name

reset—resets the system.

Synopsis

```
reset
```

Parameters

No parameters

Example

The following example indicates a typical display when using the reset commands.

```
MOTLoad> reset
Copyright Motorola Inc. 1999-2002, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 0.1 (Motorola HXEB100)

               ***  Proto Build For Early Access ***

MPU-Int Clock Speed  =900MHz
MPU-Ext Clock Speed  =100MHz
MPU-Type             =MPC7455

Reset/Boot Vector    =BankA

Local Memory Found   =10000000 (&268435456)
User Buffer Location =00560000:0075FFFF

MOTLoad> time
FRI JUN  7 13:51:27.00 2002
MOTLoad>
```

See Also

3.1.77 rs

Name

rs—sets a specified PowerPC register with the specified value.

Synopsis

```
rs [-d] [-n]
```

Parameters

```
-d Ph: Register Data
-n Ps: Register Name
```

Example

The following example indicates a typical display when using the reset commands.

```
MOTLoad> rs -d0010 -nr4
r4 =00000010
```

Error Messages

udRegisterSet(): unknown register name

Self explanatory.

See Also

rd

3.1.78 set

Name

set—sets the Month, Day, Year, Hour, Minute, and Seconds of the real time clock (RTC) in products that support RTC hardware. The user must specify the "-t" option for this utility to modify the RTC. If no option is specified, an error message is displayed.

Synopsis

```
set [-d] -t
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
-t Ps: Date/Time String (MMDDYYHHMMSS)
```

Example

The following example indicates a typical display when using the **set** commands.

```
MOTLoad> set -t060702164500
MOTLoad> time
FRI JUN  7 16:45:02.00 2002

For SBC's without a Real-Time Clock device, the PowerPC time base can be
set/displayed
MOTLoad> set -d/dev/ppctb -t060702164500

MOTLoad> time -d/dev/ppctb
FRI JUN  7 16:45:02.00 2002
```

Error Messages

timeSet(): open(/dev/rtc) failed, errno = <value>

Unable to open clock device.

timeSet(): ioctl(107) failed, errno = <value>

Unable to read time in RTC.

See Also

time

3.1.79 sromRead

Name

sromRead—reads the contents of a SROM device into a memory buffer, as specified by the command line arguments.

Synopsis

```
sromRead [-a] -d [-n] [-o]
```

Parameters

```
-a Ph: Address of Data Buffer (Default = User Download Buffer)
-d Ps: Device Name
-n Ph: Number of Bytes (Default = Entire Device)
-o Ph: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **sromRead** commands.

```
MOTLoad> sromRead -d/dev/i2c0/srom/AA -n20
Reading SROM contents...
Read Complete
SROM contents located at memory address 0x00560000

MOTLoad> mdb -a00560000 -c20

00560000 FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF  .....
00560010 FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF  ....2
```

Error Messages

sromRead(): open(<device>) failed, errno = <value>

Unable to open SROM device.

sromRead(): ioctl(100) failed, errno = <value>

Unable to determine SROM device type.

sromRead(): unsupported device type

SROM not supported type (4).

Number of Bytes and/or Starting Byte Offset Invalid

Self explanatory.

sromRead(): read() failed, status = <number of blocks read>, errno = <value>

Unable to read SROM.

sromRead(): close() failed, status = <value>, errno = <value>

Close of SROM device failed.

See Also

sromWrite

3.1.80 sromWrite

Name

sromWrite—writes the contents of a memory buffer to an SROM device, as specified by the command line arguments.

Synopsis

```
sromWrite [-a] -d [-n] [-o]
```

Parameter

```
-a Ph: Address of Data Buffer (Default = User Download Buffer)
-d Ps: Device Name
-n Ph: Number of Bytes (Default = Entire Device)
-o Ph: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **sromWrite** command.

```
MOTLoad> mmb -a00560000
00560000 FF? 12
00560000 FF? 34
00560000 FF? 56
00560003 FF? .

MOTLoad> sromWrite -d/dev/i2c0/srom/AA -n4

Device ID                    = /dev/i2c0/srom/AA
Source Starting Address      = 0x00560000
Destination Offset           = 0x00000000
Number of Effective Bytes    = 0x00000020

Program SROM Memory (Y/N)? y
Writing SROM contents... Write Complete
```

Error Messages

sromWrite(): open(<device>) failed, errno = <value>

Unable to open SROM device.

sromWrite(): ioctl(100) failed, errno = <value>

Unable to determine SROM device type.

sromWrite(): unsupported device type

SROM not supported type (4).

Number of Bytes and/or Starting Byte Offset Invalid

Self explanatory.

sromWrite(): write() failed, status = <number of blocks written>, errno = <value>

Unable to write SROM.

sromWrite(): close() failed, status = <value>, errno = <value>

Close of SROM device failed.

See Also

sromRead

3.1.81 sta

Name

sta—loads and attaches the symbols from the specified address. 44 bytes are provided for each symbol name. The MOTLoad symbol table format is as follows:

```
unsigned int symbolcount;
/* Number of symbols in this table. */
struct {
 /* for each symbol... */
        unsigned int symbolvalue;
 /* value of this symbol */
         char symbolname[44];
        /* name of this symbol */
} symbols[];
```

Note: Symbols must be sorted in ascending order based on symbol value.

Once a symbol table has been attached, all displays of physical addresses are first looked up in the symbol table to see if the address is in range of any of the symbols (symbol data). If the address is in range, it is displayed with the corresponding symbol name and offset (if any) from the symbol's base address (symbol data). In addition to the display, any command line input that supports an address as an argument can now take a symbol name for the address argument. The address argument is first looked up in the symbol table to see if it matches any of the addresses (symbol data) before conversion takes place.

It is the user's responsibility to load the symbol table into memory.

Synopsis

```
sta [-a]
```

Parameters

```
-a Ph: Memory Address of Loaded Symbol Tables
```

Example

The following example indicates a typical display when using the **sta** command.

```
MOTLoad> sta -a00560000
```

Error Messages

Non-displayable symbol name.

Self explanatory.

Symbol data fields are not sorted numerically.

Self explanatory.

Identical symbol names.

Self explanatory.

See Also

stl

3.1.82 stl

Name

stl—displays all symbol table entries that match the name argument supplied by the user.

Synopsis

```
stl [name]
```

Output Definitions:

```
B = Built-In Symbol Table Entry
D = Dynamic Symbol Table Entry
U = User-Defined Symbol Table Entry

Note: Symbol table entries are displayed with either B = .bss, D = .data,
and T = .text
```

Parameters

```
The name argument is the name of the MOTLoad symbol being searched.
```

Example

The following example indicates a typical display when using the **stl** command:

```
MOTLoad> stl testRam
B:0015AE80 T testRamEccMonitor
B:0015F3E8 T testRam
B:0015F56C T testRamAddressing
B:0015F614 T testRamAlternating
B:0015F6BC T testRamBitToggle
B:0015F764 T testRamBounce
B:0015F80C T testRamCodeCopy
B:0015F8D8 T testRamMarch
B:0015F980 T testRamPatterns
B:0015FA28 T testRamPermutations
B:0015FAD0 T testRamQuick
B:0015FB78 T testRamRandom
B:001811C8 D testRamEccMonitorFullExplanation
```

```
B:00182584 D testRamFullExplanation
B:00182684 D testRamAltFullExplanation
B:0019C3F0 D testRamRandomSeed
```

Error Messages

No symbol table has been attached.

Self explanatory.

See Also

sta

3.1.83 stop

Name

stop—turns off the oscillator in the RTC chip. The board is shipped with the RTC oscillator stopped to minimize current drain from the onchip battery. Normal cold start of the board with the MOTLoad Flash devices installed gives the RTC a "kick start" to begin oscillation.
Use set command to restart the clock.

Synopsis

```
stop
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **stop** command.

```
MOTLoad> stop
(Clock is in Battery Save Mode)
MOTLoad>
```

Error Messages

timeStop(): open(<device>) failed, errno = <value>

Failed to open timekeeper.

timeStop(): ioctl(110) failed, errno = <value>

Failed to stop clock.

See Also

set

3.1.84 taskActive

Name

taskActive—displays information about active MOTLoad tasks. By default, only test tasks are displayed and the active task table is scanned once. The -a option displays all tasks. Options -l, n, and -t control continuous task table monitoring. Options -i, -j, -q and -s control how the output is displayed. Numerical values are decimal numbers. The -q option overrides the other options.

Synopsis

```
taskActive [-a] [-i] [-d] [-l] [-n] [-q] [-s] [-t]
```

Parameters

```
-a O : Display All Types of Tasks
-i P*: Delay Interval in Seconds Between Entries of the Active Task Table
-j P*: Delay Interval in Seconds Between Entry Lines of the Active Task
Table
-l P*: Number of Loops Through the Active Task Table
-n O : Loop Display Till No Further Test Tasks are Active
-q O : Quick One-Line Status - Running/Stopped
-s O : Keep All Output on a Single Line
-t P*: Loop Display Till this Number of Seconds has Expired
```

Example

The following example indicates a typical display when using the **stl** command.

```
MOTLoad> testRam
MOTLoad> taskActive
tName: testRam
  sPID=00000011 ePID=00000012 eS.eM-1.1 errCnt=00000000 sStatus=00
  sTime=17:14:43 eTime=00:00:07 sErrNo=00000000 eErrNo=00000000

MOTLoad> taskActive -q
Running

MOTLoad> taskActive -q
Stopped
```

See Also

testSuite

3.1.85 tc

Name

tc—single-steps through the user program.

Synopsis

```
tc [-c]
```

Parameters

```
-c Pd: Count (Default = 1)
```

Example

The following example indicates a typical display when using the **tc** command.

```
MOTLoad>tc
```

See Also

as, *br*, *ds*, *gd*, *gn*, *go*, *gt*, *rd*, *rs*, *td*

3.1.86 td

Name

td—trace single-steps through a user-program to the specified address.

Synopsis

```
td -a [-c]
```

Parameters

```
-a Ph: Address
-c Pd: Count (Default = 1)
```

Example

The following example indicates a typical display when using the **td** command.

```
MOTLoad>td
```

See Also

as, *br*, *ds*, *gd*, *gn*, *go*, *gt*, *rd*, *rs*, *td*

3.1.87 testDisk

Name

testDisk—validates the operation of the interface (control paths/signals) to the specified test disk device. The command also validates the operation of the test disk device.

Synopsis

```
testDisk [-b] -d [-e] [-n] [-p] [-r] [-s] [-t] [-v] [-w]
```

Warning

Use testDisk with caution. This command is destructive if not used correctly.

Parameters

```
-b Ph: Memory Buffer/Transaction Size (Default = 131072 Bytes)
-d Ps: Disk Device
-e Ph: Ending Block (Default = Last Block of Device)
-n Ph: Number of Blocks (Default = Entire Device)
-p O : Use Test Pattern (Default = Random Pattern)
-r O : Read-Only Mode (Default = Write/Read/Verify Mode)
-s Ph: Starting Block (Default = 0)
-t O : Elapsed Time Report
-v O : Verbose Output
-w O : Write-Only Mode (Default = Write/Read/Verify Mode)
```

Example

The following example indicates a typical display when using the **testDisk** command.

```
MOTLoad> testDisk -n2 -d/pci0/scsi0/disk0 -v
disk(/pci0/scsi0/disk0) : Disk Diagnostic Test Parameters:
disk(/pci0/scsi0/disk0) : Starting 1 iterations of (SEQUENTIAL) operations
on block range 0-2
disk(/pci0/scsi0/disk0) : (VERIFY) starting iteration 1
disk(/pci0/scsi0/disk0) : Writing blocks 0-2
disk(/pci0/scsi0/disk0) : Reading blocks 0-2
disk(/pci0/scsi0/disk0) : Verifying blocks 0-2
```

```
disk(/pci0/scsi0/disk0) : (VERIFY) completing iteration 1
disk(/pci0/scsi0/disk0) : Summary Results for device
disk(/pci0/scsi0/disk0) : No errors found
```

3.1.88 testDocHwInt

Name

testDocHwInt—verifies the hardware connectivity of the Disk on Chip (DoC) by reading and verifying the chip ID.

Synopsis

```
testDocHwInt [-d] [-v]
```

Parameters

```
-d  Ps: DoC Device Name (Default=/dev/doc0)
-v  0 : Verbose Mode
```

Example

The following example indicates a typical display when using the **testDocHwInt** command.

```
MOTLoad> testDocHwInt -d/dev/doc0
```

3.1.89 testEnetPtP

Name

testEnetPtP—verifies the point-to-point connectivity of the Ethernet devices addressed, including the completeness of the data being transferred.

Synopsis

```
testEnetPtP [-d] [-e] [-f] [-l] [-n] [-s] [-t] [-v] [-w] [-x]
```

Parameters

```
-d  Ps: TxD Ethernet Device/Interface Name (Default = /dev/enet0)
-e  Ps: RxD Ethernet Device/Interface Name (Default = /dev/enet1)
-f  0 : Filter Broadcast Frames
-l  Pd: Acceptable Loss in Number of Frames (Default = 0)
-n  Pd: Number of Frames (Default = 512)
-s  Pd: Frame Size (Default = 512)
-t  Pd: RxD Time Out (Default = 30 Seconds)
-v  0 : Enable Verbose Mode
-w  Pd: Frame to Frame Delay (Default = 0)
-x  0 : Disable Data Verification
```

Example

The following example indicates a typical display when using the **testEnetPtP** command.

```
MOTLoad> TestEnetPtP -d/dev/enet0 -e/dev/enet1 -s1500
-n100000
```

3.1.90 testNvramRd

Name

testNvramRd—validates read operations to an NVRAM device.

Synopsis

```
testNvram [-d] [-i] [-o]
```

Parameters

```
-d Ps: Device Name (Default = /dev/nvram)
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testNvramRd** command.

```
MOTLoad> testNvramRd -d/dev/nvram -n20

MOTLoad> testStatus
Passed (ePID=00000020): testNvramRd -d/dev/nvram -n20
```

See Also

testNvramRdWr

3.1.91 testNvramRdWr

Name

testNvramRdWr—validates the operation of the NVRAM device. Both read and write operations are supported. The test application assures that each byte of the NVRAM is addressable, readable, and writable. This test does not alter the contents of NVRAM if no system error or reset occurs. The actual test operates as follows: write alternating patters: 00x0, 0xFF, 0x55, 0xAA, 0xC3, and 0x3C to NVRAM and verify it.

Synopsis

```
testNvramRdWr [-d] [-n] [-o]
```

Parameters

```
-d Ps: Device Name (Default = /dev/nvram)
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testNvramRdWr** command.

```
MOTLoad> testNvramRd -d/dev/nvram -n20

MOTLoad> testStatus
Passed (ePID=00000020): testNvramRd -d/dev/nvram -n20
```

See Also

testNvramRd

3.1.92 testRam

Name

testRam—executes each of the tests shown below in the order listed. Each test is given a copy of the command line arguments (if any are specified). The following are standard tests: testRamAddr, testRamAlt, TestRamBitToggle, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom.

Note: **testRam** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRam [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRam -v
Executing RAM Addressing:  PASSED
Executing RAM Alternating:  PASSED
Executing RAM Bit Toggle:  PASSED
Executing RAM Bounce:  PASSED
Executing RAM Code Copy:  PASSED
Executing RAM March:  PASSED
Executing RAM Patterns:  PASSED
Executing RAM Permutations:  PASSED
Executing RAM Quick:  PASSED
Executing RAM Random:  PASSED
```

See Also

testRamAddr, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.93 testRamAddr

Name

testRamAddr—assures addressability of memory, using a memory test block. Addressing errors are sought by using a memory location address as the data for that location. This test proceeds as follows: (1) A Locations Address is written to its location (n). (2) The next location (n+4) is written with its address complemented. (3) The next location (n+8) is written with the most significant (MS) 16 bits and least significant (LS) (4) Steps 1, 2, and 3 are repeated throughout the memory block. (5) The memory is read and verified for the correct data pattern(s) and any errors are reported. (6) The test is repeated using the same algorithm as above (steps 1 through 5) except that inverted data is used to insure that every data bit is written and verified at both "0" and "1".

Note: **testRamAddr** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamAddr [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRamAddr -v
Executing RAM Addressing:  PASSED
```

See Also

testRam, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.94 testRamAlt

Name

testRamAlt—assures addressability of memory, using a memory test block. Addressing errors are sought by writing an alternating pattern of all zeros and all ones. This test proceeds as follows: (1) Location (n) is written with data of all bits 0. (2) The next location (n+4) is written with all bits. (3) Steps 1 and 2 are repeated throughout the memory block. (4) The memory is read and verified for the correct data pattern(s) and any errors are reported.

Note: **testRamAlt** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamAlt [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRamAlt -v
Executing RAM Addressing: PASSED
```

See Also

testRam, *testRamAddr*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.95 testRamBitToggle

Name

testRamBitToggle—assures that each memory location in the memory test block is written with the test data pattern. Each memory location in the memory block is then written with the test data pattern complemented. The memory under test is read back to verify that the complement test data is properly retained. Each memory location in the memory block is then written with the test data pattern. The memory under test is read back to verify that the test data is properly retained. The test proceeds as follows: (1) Random data seed is copied into a work register. (2) Work register data is shifted right one bit position. (3) Random data seed is added to work register using unsigned arithmetic. (4) Data in the work register may or may not be complemented. (5) Data in the work register is written to current memory location.

Note: **testRamBitToggle** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamBitToggle [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBitToggle** command.

```
MOTLoad> testRamBitToggle -v
Executing RAM Addressing: PASSED
```

See Also

testRam, *testRamAddr*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.96 testRamBounce

Name

testRamBounce—writes all ones to all memory addresses within the default or specified memory block, then performs a read-back and verify of each memory address. If a mis-compare is detected, an error is logged. This operation is repeated a second time but the write data is all zero.

Note: **testRamBounce** only test memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamBounce [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBounce** command.

```
MOTLoad> testRamBounce -v
Executing RAM Bounce: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.97 testRamCodeCopy

Name

testRamCodeCopy—copies a small test code application to memory and executes it. This test code then copies itself to the next higher memory address and executes the new copy. This process is repeated until the memory buffer supplied by the *-n* option has been exhausted. This test application does not attempt execution from an address which does not reside within system memory (RAM). Due to bus latencies between instruction fetches across a PCI or VME bus, the processor would time-out and generate an exception.

Note: **testRamCodeCopy** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamCodeCopy [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBounce** command.

```
MOTLoad> testRamCodeCopy -v
Executing RAM Code Copy: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.98 testRamEccMonitor

Name

testRamEccMonitor—monitors system hardware for the indication of an ECC single bit error or an ECC multiple bit error. This test does not execute if the memory controller is not configured to support ECC memory devices.

Note: **testRamEccMonitor** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamEccMonitor [-d] [-e] [-q] [-t] [-v]
```

Parameters

```
-d Ps: Device Instance (Default = 1)
-e Pd: Error Threshold (Default = 1)
-q Pd: Query Interval, in Seconds (Default = 3)
-t Pd: Time in Seconds to Run Test (Default = 60, 0 = Run Forever)
-v 0: Verbose
```

Example

The following example indicates a typical display when using the **testRamEccMonitor** command.

```
MOTLoad> testRamEccMonitor -v
Single bit RAM ECC error(s) detected. Single bit error count = 3.
Address of first detected error - 00105678. Erroneous bit = 19.
Memory Controller 0

MOTLoad> testRamEccMonitor -v
MOTLoad> There are NO configured ECC Memory Controllers
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.99 testRamMarch

Name

testRamMarch—assures addressability of memory, using a memory test block. Addressing errors are sought by writing a pattern and its complement to each location. The test proceeds as follows: (1) Starting at the beginning test address and proceeding towards the ending address, each location is written with the starting pattern. (2) Starting at the beginning test address and proceeding towards the ending address, each location is verified to contain the starting pattern and is written with the complement of the starting pattern. (3) Starting at the ending test address and decreasing to the starting test address, each location is verified to contain the complement of the starting pattern and is then written with the starting pattern.

Note: **testRamMarch** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamMarch [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamMarch** command.

```
MOTLoad> testRamMarch -v
Executing RAM March: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.100 testRamPatterns

Name

testRamPatterns—assures addressability of memory, using a memory test block. Memory in the test block is initialized with all ones (0xFFFFFFFF). For each location in the test block, the following patterns are used: 0x00000000 0x01010101 0x03030303 0x07070707, 0x0F0F0F0F 0x1F1F1F1F 0x3F3F3F3F 0x7F7F7F7F. Each location in the test block is, individually, written with the current pattern and the 1's complement of the current pattern. Each write is read back and verified.

Note: **testRamPatterns** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamPatterns [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamPatterns** command.

```
MOTLoad> testRamPatterns -v
Executing RAM Patterns: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPerm*, *testRamQuick*, *testRamRandom*

3.1.101 testRamPerm

Name

testRamPerm—performs a test which verifies that the memory test block can accommodate 8-bit, 16-bit, and 32-bit writes and reads in any combination. This test performs three data size test phases in the following order: 8, 16, and 32 bits. Each test phase writes a 16-byte data pattern (using its data size) to the first 16 bytes of every 256-byte block of memory in the test block. The test phase then reads and verifies the 16-byte block using 8-bit, 16-bit, and 32-bit access modes.

Note: **testRamPerm** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamPerm [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamPerm** command.

```
MOTLoad> testRamPerm -v
Executing RAM Permutations: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamQuick*, *testRamRandom*

3.1.102 testRamQuick

Name

testRamQuick—performs a test which verifies that the memory test block can be written to and read from using data patterns. Each pass of this test fills the test block with a data pattern by writing the current data pattern to each memory location from a local variable and reading it back into that same register. The local variable is verified to be unchanged only after the write pass through the test range. This test uses a first pass data pattern of 0x00000000 and 0xFFFFFFFF for the second pass.

Note: **testRamQuick** only test memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamQuick [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamQuick** command.

```
MOTLoad> testRamQuick -v
Executing RAM Quick: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamRandom*

3.1.103 testRamRandom

Name

testRamRandom—assures addressability of memory, using a memory test block. Addressing errors are sought by writing a random pattern and its complement to each location. The test proceeds as follows: (1) A random pattern is written throughout the test block. (2) The random pattern complemented is written throughout the test block. (3) The complemented pattern is verified. (4) The random pattern is rewritten throughout the test block. (5) The random pattern is verified.

Note: **testRamRandom** only tests memory in blocks, thus specifying a memory area size that is not a multiple of the block size results in part of the memory area being untested.

Synopsis

```
testRamRandom [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16 KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1 MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamRandom** command.

```
MOTLoad> testRamRandom -v
Executing RAM Quick: PASSED
```

See Also

testRam, *testRamAddr*, *testRamAlt*, *testRamBitToggle*, *testRamBounce*, *testRamCodeCopy*, *testRamMarch*, *testRamPatterns*, *testRamPerm*, *testRamQuick*

3.1.104 testRtcAlarm

Name

testRtcAlarm—assures proper addressability of the RTC device. The test proceeds as follows: (1) Clear the interrupt counter used by the RTC interrupt handler. (2) Enable the RTC interrupt function in the RTC device. (3) Set the RTC ALARM function to generate interrupts once a second. (4) Sleep the test application for a preset amount of time (seconds). This allows the RTC interrupt handler time to collect interrupts and increment the interrupt counter. (5) When the test application wakes up, immediately turn off the RTC interrupt function. (6) Get the interrupt counter value and compare it with the number of seconds the test application was asleep. If the comparison is outside an expected range, the test has failed. (7) Disable the RTC ALARM function.

Synopsis

```
testRtcAlarm [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcAlarm** command.

```
MOTLoad> testRtcAlarm
```

See Also

testRtcRollOver, *testRtcTick*, *testRtcReset*

3.1.105 testRtcReset

Name

testRtcReset—ensures the RTC is capable of generating a board level reset. The test proceeds as follows: (1) Set the time delay to 1 second. (2) Set the RTC's watchdog timer to drive the reset pin. (3) Start the watchdog timer. (4) Wait up to 4 seconds for a reset to occur. (5) If no reset is generated, log an error indicating the occurrence, and report the watchdog expiration status. (6) Disable the operation of the RTC watchdog.

Synopsis

```
testRtcReset [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcReset** command.

```
MOTLoad> testRtcReset
```

See Also

testRtcRollOver, *testRtcTick*

3.1.106 testRtcRollOver

Name

testRtcRollOver—verifies the 'roll-over' operation of the Real Time Clock (RTC). The test proceeds as follows: (1) Check the RTC STOP bit, and if set, turn on the RTC CLOCK. (2) Set the RTC date to "December 31, 1999 at 23 hours, 59 minutes, and 59 seconds. (3) Verify the RTC day/month/year and hours/minutes/seconds have rolled over. (4) Restore the original day/month/year and hours/minutes/seconds values. (5) If the RTC STOP bit, which disables the RTC.

Synopsis

```
testRtcRollOver [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcAlarm** command.

```
MOTLoad> testRtcRollOver
```

See Also

testRtcAlarm, *testRtcTick*, *testRtcReset*

3.1.107 testRtcTick

Name

testRtcTick—verifies the functionality of the Real Time Clock (RTC). This test does not check clock accuracy. This test application destroys the value in the SECONDS register. The test proceeds as follows: (1) Check the RTC STOP bit, and if set, turn on the RTC CLOCK and initializes to default values. (2) Verify the SECONDS register is being updated. If this register is not updating, return a failure. (3) Set the SECONDS register to zero and delay the test application for a few seconds. When the test application wakes up, read the SECONDS register and verify the value has changed. (4) If the RTC STOP bit was originally set, restore the STOP bit, which disables the RTC.

Synopsis

```
testRtcTick [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcTick** command.

```
MOTLoad> testRtcTick
```

See Also

testRtcAlarm, *testRtcRollOver*, *testRtcReset*

3.1.108 testSerialExtLoop

Name

testSerialExtLoop—validates the operation of the external serial loopback path. This is a generic serial external loopback test application that requires an external loopback connector (configuration of connector is dependent upon the specific hardware design of the board). The test application verifies the ability of a serial port device to send and receive random ASCII characters.
Note: This test cannot be executed on internal serial devices (that means, no access for loopback connector) or serial devices that are needed for essential functions (for example, MOTLoad console port).

Synopsis

```
testSerialExtLoop [-d] [-n] [-t] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/com2)
-n Pd: Number of Characters (Default = 8192)
-t Pd: RxD Time Out (Default = 30 seconds)
-v 0: Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testSerialExtLoop** command.

```
MOTLoad> testSerialExtLoop -d/dev/com3
```

See Also

testSerialIntLoop

3.1.109 testSerialIntLoop

Name

testSerialIntLoop—validate the operation of the internal serial loopback path. This is a generic serial internal loopback test application that does not require an external loopback connector. The test application verifies the ability of a serial port device to send and receive random ASCII characters to its internal registers.

Synopsis

```
testSerialIntLoop [-d] [-n] [-t] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/com2)
-n Pd: Number of Characters (Default = 8192)
-t Pd: RxD Time Out (Default = 30 seconds)
-v 0 : Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testSerialIntLoop** command.

```
MOTLoad> testSerialIntLoop -d/dev/com3
```

See Also

testSerialExtLoop

3.1.110 testStatus

Name

testStatus—displays pass/fail status information of completed test tasks. If no test tasks have completed, no status is displayed. By default all test status entries are displayed. To simplify status queries for automated testing the *-q* option returns a concise Passed or Failed message. The *-l* option provides more detailed test status information. The *-n* and *-s* options take decimal number arguments. The *-e* option requires a hexadecimal argument. These options allow the user to display the status of user specified test status entries. The status fields displayed by this command are equivalent to those used in the errorDisplay command.

Synopsis

```
testStatus [-eP] [-l] [-nPd] [-q] [-sPd]
```

Parameters

```
-e Ph: Executive Process/Task Identifier of Entry to Display
-l  0: Long (Detailed) Display
-n Pd: Number of Entries to Display
-q 0 : Quick Summary Display
-s Pd: Specific Entry Number (1 to n) to Display
```

Example

The following example indicates a typical display when using the **testStatus** command.

```
MOTLoad> testStatus
-d/dev/com3Failed (ePID=00000015):testI2cDimmSpd -d/dev/i2c0/srom/A0 -n1


Passed (ePID=00000017):testI2cDimmSpd -d/dev/i2c0/srom/A0 -n0



MOTLoad> testStatus -l

tName =testI2cDimmSpd -d/dev/i2c0/srom/A0 -n1

  entryNumber=00000001 errCnt=00000001 loopCnt=00000000
```

```
  sPID=00000011 ePID=00000015 eS.eM=2.1 sErrNo=00000000 eErrNo=0A000021
  sTime=10:55:09 fTime=10:55:12 eTime=00:00:03
tName =testI2cDimmSpd -d/dev/i2c0/srom/A0 -n0
  entryNumber=00000002 errCnt=00000000 loopCnt=00000000
  sPID=00000011 ePID=00000017 eS.eM=2.1 sErrNo=00000000 eErrNo=00000000
  sTime=10:55:18 fTime=10:55:22 eTime=00:00:04
```

See Also

clear, *errorDisplay*

3.1.111 testSuite

Name

testSuite—executes the specified test suite. The test suite is specified by either the *-n* option (MOTLoad built-ins or user-created) or by the *-a* option (memory resident). The *-a* option is useful when you have a text file containing commands you want executed in a test suite; for example, **testRamQuick** or **testRtcTick**. If this text file has been downloaded, using the **tftpGet** MOTLoad command, to a particular address; for example, 0x05000000, you can use the *-a* option to execute the test suite. For example, typing **testSuite –a0x05000000** executes the test suite.

The *-l* option displays the contents of the specified test suite.

The *-c*, *-t* and *-s* options control the loop and execution aspects of the test suite.

The *-r* option overrides the *-c* and *-q* options, allowing only one iteration of the test suite, which is run in the background with no console messages. Control may be returned to the console before the test suite has completed with the -r option; use test status to determine the outcome of the background suite.

Options *-c*, *-t* and *-w* take decimal numbers as arguments.

The *-m* (multi-line mode) causes the on-going test status information to scroll the display rather than overwriting the previous line.

The *-q* (quiet) option reduces the amount of displayed information to only error and warnings, the on-going test status info, and the test summary output.

The *-w* (wait-time) option speeds up the console display, for those times when test time is critical.

Synopsis

```
testSuite [-aP*] [-cP*] [-d] [-k] [-l] [-m] [-nPs] [-q] [-r] [-s] [-tP*]
[-wP*]
```

Parameters

```
-a P*: Memory Address of Test Suite
-c P*: Number of Loops to Execute Test Suite (Default =1)
-d O : Display All Test Suites
-k O : Terminate (Kill) Defunct Test-Tasks
-l O : Display Contents of Test Suite, Test Suite Must be Specified
-m O :Multi-Line display of running test status
-n Ps: Name of Test Suite (Built-Ins/Created) to Execute
-q O : Quiet output (ignored if -r is used)
-r O : Remote Execution (Silent, Background, -c, -q Ignored)
-s O : Stop On Error
-t P*: Number of Seconds to Execute Test Suite (Time To Live)
-w P*: Wait-time between status lines output, in sec(def=1)
```

Example

The following example indicates a typical display when using the **testSuite** command. Note: the same test suite was used for both examples, but the options of the second example reduced the console I/O, and thus the test execution time.

```
MOTLoad> testSuite -ns
Started (ePID=00000043): testRamAddr
Started (ePID=00000044): testRamBounce
Passed (ePID=00000043): testRamAddr
Passed (ePID=00000044): testRamBounce
TestSuite Name: s
  Start Time   =13:31:42 ElapsedTime=00:00:05
  Total Time =000:00:05 Error Count =00000000
  LoopCount =00000001 Cpu TAU Temp =090C Therm Sensor =N/A

PASSED

MOTLoad> testSuite -ns -w0 -q
TestSuite Name: s
  Start Time =13:31:34 Elapsed Time =00:00:02
  Total Time =000:00:02 Error Count =00000000
  Loop Count = 00000001 Cpu Tau Temp =090C Therm Sensor =N/A

PASSED
```

See Also

testSuiteMake, *testStatus*

3.1.112 testSuiteMake

Name

testSuiteMake—allows the user to create a custom test suite. Entering this command at the MOTLoad command line prompt puts the user into edit mode. Pressing Ctrl-C or entering an empty string exits the edit mode during creating a test suite. The **testSuiteMake** command executes as a utility task.

Note: The number of tests that can be included in a test suite is limited by the number of active tasks or processes, subtracted from the maximum number of processes MOTLoad allows. If too many tests are included, an error similar to the following occurs when the test suite is executed (the number of tests allowed depends upon the specific board product the tests are running on, but as a general rule, no more than 50 tests are allowed):

Internal Error: Fork of "xxxx" Failed

Synopsis

```
testSuiteMake -n -r
```

Parameters

```
-n Ps: Name of Test Suite to Make (Create)
-r retrieve testSuite description from the GEV named in the -n parameter
(see Appendix A for usage description)
```

Example

The following example indicates a typical display when using the **testSuiteMake** command.

```
MOTLoad> testSuiteMake -nTest1
testRam
testNvramRd
testRtcTick

1 testRam
2 testNvramRd
3 testRtcTick
```

```
MOTLoad> testSuite -1 -nTest1
1 testRam
2 testNvramRd
3 testRtcTick
```

See Also

testSuite

3.1.113 testThermoOp

Name

testThermoOp— verifies actual operation of the thermostatic portion of the temperature sensor. The test checks for the generation of an interrupt by the temperature sensor when the board under the test's temperature exceeds a thermal limit. This test must be run under conditions of changing board temperatures. (User prompts for necessary temperature changes are provided.) A temperature increase of at least 2 degrees is required, followed by a reduction to at least one degree less than the starting temperature. The amount of time allowed for the temperature change is selected with a command line argument (3 minute default). If a thermal limit interrupt occurs within the test time, and if subsequently, after temperature reduction, the thermal limit interrupt is negated, the test passes. All other conditions report a failure.

Note: This test can only be run if the board is kept between 0 and 70 degrees Celsius. Outside that range, writes to the non-volatile memory of the ds1621 are not allowed, so the thermal limits cannot be set, and the test fails.

Synopsis

```
testThermoOP -d [-t]
```

Parameters

```
-d Ps: Device name
-t Pd: Time in minutes to wait for interrupt to occur
(default = 3)
```

Example

The following example would be appropriate if the board temperature changes were expected to occur within two minutes.

```
testThermoOp -d/dev/i2c0/thermo/90 -t2
```

3.1.114 testThermoQ

Name

testThermoQ—verifies the generation of an interrupt by the temperature sensor device. The current temperature is read, and then a high limit, which is less than the current temperature, is set. This immediately causes the device to report an over-temperature condition through its configuration register and its interrupt out line. Following a successful high limit test, the thermostat is placed in a quiescent state, with limits of –55 and +125, and the interrupts disabled. This prevents further high temperature interrupts from being generated.

This test can be run under conditions of stable or gradually changing board temperature. Interrupt generation is verified.

Note: This test can only be run if the board is kept between 0 and 70 degrees Celsius. Outside that range, writes to the non-volatile memory of the ds1621 are not allowed, so the thermal limits cannot be set, and the test fails.

Synopsis

```
testThermoQ -d
```

Parameters

```
-d Ps: Device name
```

Example

```
testThermoQ -d/dev/i2c0/thermo/90
```

3.1.115 testThermoRange

Name

testThermoRange—reads the current board temperature as reported by the temperature sensor, and compares it to the temperature range specified on the command line. If the current temperature goes outside the specified range, the test fails.

This test allows users to control the conditions under which other tests (as in a test suite) are running. To ensure testing does not continue outside a desired range of board temperature, set up this test and stop on error.

This test can also be used to provide a "sanity check" for the temperatures reported by the device. Some factory test automations may ignore the existing temperature display of the test suite completion banner, as it varies. By adding this test to factory test suites, one can ensure the thermal sensor is reporting reasonable temperature.

Synopsis

```
testThermoRange -d -h -l
```

Parameters

```
-d Ps: Device name
-h Pd: High temperature limit in Celsius, maximum of 124
-l Pd: Low temperature limit in Celsius, minimum of –54
```

Note Although temperature can be reported with 5 degree accuracy, the limits my be specified as whole numbers; with no fractional component. The temperature must exceed the limit by a whole degree in order to cause test failure.

Example

The following test fails if the board temperature is as low as –25 degrees Celsius (or lower), or is as high as 45 degrees Celsius (or higher).

```
testThermoRange -d/dev/i2c0/thermo/90 -h44 -l-24
```

3.1.116 testWatchdogTimer

Name

testWatchdogTimer—tests the watchdog timer device. The test application checks for timer accuracy allowing a tolerance of 30 microseconds. Both interrupt and reset modes are validated through this test.

Synopsis

```
testWatchdogTimer -d [-r] [-t] [-v]
```

Parameters

```
-d Ps: Device Name
-r 0 : Set to Reset Mode (Default = Interrupt Mode)
-t Pd: Time in Milliseconds to Run Test (Default = 5000)
-v 0 : Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testWatchdogTimer** command.

```
MOTLoad> testWatchdogTimer -d/dev/wdt0 -t1000 -v
```

See Also

3.1.117 tftpGet

Name

tftpGet—downloads a file from the specified server to local memory.

Synopsis

```
tftpGet [-a] -c [-d] -f [-g] [-m] [-r] -s [-v]
```

Parameters

```
-a  Ph: Memory Address (Default = User Download Buffer)
-c  Ps: Client IP Address
-d  Ps: Device Name (Default = /dev/enet0)
-f  Ps: Boot File Name
-g  Ps: Gateway IP Address (Default = n.n.n.253)
-m  Ps: Subnet Mask (Default = 255.255.255.0)
-r  Pd: Retry Count (Default = Forever)
-s  Ps: Server IP Address
-v  O : Verbose Mode
```

The character codes displayed during verbose mode (**–v**) are as follows:

[	Indicates that a connection to the tftp server is being attempted.
]	Indicates that the connection to the tftp server was successful.
>	Indicates that a request for the file is being sent to the server.
<	Indicates that a block of data has been received from the server.

Example

This example is a typical display when using the **tftpGet** command.

```
MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0 -
f/tmp/hxeb100.rom
Network Loading from: /dev/enet0
Loading File: /tmp/hxeb100.rom
Load Address: 00560000

Client IP Address      = 192.168.1.190
```

```
Server IP Address      = 192.168.1.33
Gateway IP Address     = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0

Network File Load in Progress...

Bytes Received =&1048576, Bytes Loaded =&1048576
Bytes/Second =&209715, Elapsed Time =5 Second(s)
```

Error Messages

tftpGet(): illegal IP address <IP address>

Self explanatory.

tftpGet(): open(<device>) failed, errno = <value>

Failed to open Ethernet device.

tftpGet(): malloc(<memory address for download>) failed, errno = <value>

Unable to malloc sufficient memory for file.

Error Status: Not defined, see error message (if any)

Unexpected error return.

Error Status: File not found.

Self explanatory.

Error Status: Access violation.

No read permission on server.

Error Status: Illegal TFTP operation.

Protocol violation.

Error Status: Unknown transfer ID.

Invalid command header.

Error Status: No such user.

Invalid identification.

Network I/O Error Codes

0x01	TFTP retry count exceeded
0x02	BOOTP retry count exceeded
0x03	User abort, break key depressed
0x04	Timeout expired
0x05	DHCP retry count exceeded

See Also

tftpPut

3.1.118 tftpPut

Name

tftpPut—uploads a local memory buffer to the specified server.

Synopsis

```
tftpPut [-a] [-b] -c [-d] -f [-g] [-m] -n [-r] [-s] [-v]
```

Parameters

```
-a  Ph: Memory Address (Default = User Download Buffer)
-b  Ps: Broadcast IP Address (Default = 255.255.255.255)
-c  Ps: Client IP Address (Default = 0.0.0.0.)
-d  Ps: Device Name (Default = /dev/enet0)
-f  Ps: Boot File Name
-g  Ps: Gateway IP Address (Default = n.n.n.253)
-m  Ps: Subnet Mask (Default = 255.255.255.0)
-n Ph: Number of Bytes to Send (Put)
-r  Pd: Retry Count (Default = Forever)
-s  Ps: Server IP Address (Default = 0.0.0.0.)
-v  0 : Verbose Mode
```

The character codes displayed during verbose mode (**–v**) are as follows:

[	Indicates that a connection to the tftp server is being attempted.
]	Indicates that the connection to the tftp server was successful.
>	Indicates that a request for the file is being sent to the server.
<	Indicates that a block of data has been received from the server.

Example

The following example indicates a typical display when using the **tftpPut** command.

```
MOTLoad> tftpPut -c192.168.1.190 -s192.168.1.33 -d/dev/enet0 -
f/tmp/hxeb100.rom
Network Uploading from: /dev/enet0
Uploading File: /tmp/hxeb100.rom
Upload Address: 00560000

Client IP Address      = 192.168.1.190
Server IP Address      = 192.168.1.33
Gateway IP Address     = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0

Network File Upload in Progress...

Bytes Sent     =&1048576
Bytes/Second   =&209715, Elapsed Time =5 Second(s)
```

Error Messages

tftpPut(): illegal IP address <IP address>

Self explanatory.

tftpPut(): open(<device>) failed, errno = <value>

Failed to open Ethernet device.

Error Status: Not defined, see error message (if any).

Unexpected error return.

Error Status: Access violation.

Invalid permissions on server.

Error Status: Disk full or allocation exceeded.

Self explanatory.

Error Status: Illegal TFTP operation.

Protocol violation.

Error Status: Unknown transfer ID.

Invalid command header.

Error Status: File already exists.

Unable to overwrite file on host.

Error Status: No such user.

Invalid identification.

Network I/O Error Codes

0x01	TFTP retry count exceeded
0x02	BOOTP retry count exceeded
0x03	User abort, break key depressed
0x04	Timeout expired
0x05	DHCP retry count exceeded

See Also

tftpGet

3.1.119 time

Name

time—displays the current date and time.

Synopsis

```
time [-d] [-s]
```

Parameters

```
-d  Ps: Device Name (Default = /dev/rtc)
-s  0: Short Option (MMDDYYHHMMSS)
```

Example

The following example indicates a typical display when using the **time** command.

```
MOTLoad> time
FRI JUN 7 16:45:02.00 2002
```

For SBCs without a Real-Time Clock device, the PowerPC time base can be displayed

```
MOTLoad> time -d/dev/ppctb
FRI JUN 7 16:45:02.00 2002
```

Error Messages

timeGet(): open(<device>) failed, errno =

Unable to open RTC device.

timeGet(): ioctl(105) failed, errno = <value>

Unable to read time in RTC (short).

timeGet(): ioctl(106) failed, errno = <value>

Unable to read time in RTC (long).

See Also

set

3.1.120 transparentMode

Name

transparentMode—establishes a serial connection to another host (for example, a UNIX host) through the currently active serial connection. This is useful if the device to which the transparent serial connection is being made does not have a physical serial port (e.g., a PrPMC slave module). Once a connection is established, the MOTLoad prompt from the new host becomes active and all MOTLoad commands supported by the new host become available. The original serial port connection can be re-established by typing in the **Ctrl-A** exit sequence.

Synopsis

```
transparentMode [-b] [-d] [-e] [-p] [-s] [-w]
```

Parameters

```
-b Pd: Baut Rate (Default = 9600)
-d Ps: Device Name (Default = /dev/rtc)
-e Ph: Exit Character (Default = Ctrl-A)
-p Ps: Parity (e/o) (Default = No)
-s Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the **transparentMode** command.

```
MOTLoad> transparentMode -b9600
```

Error Messages

transparentMode(): device settings argument

Self explanatory.

transparentMode(): open(<device>) failed, errno = <value>

Unable to open device.

transparentMode(): ioctl(101) failed, errno = <value>

Unable to determine current mode of port.

transparentMode(): ioctl(100) failed, errno = <value>

Unable to set port mode.

transparentMode(): ioctl(102) failed, errno = <value>

Unable to set port baud rate.

transparentMode(): ioctl(122) failed, errno = <value>

Unable to flush port's read data buffers.

transparentMode(): ioctl(123) failed, errno = <value>

Unable to flush port's write data buffers.

write() failed

Failed write to duplicate port.

read() failed

Failed to read from console port.

See Also

3.1.121 tsShow

Name

tsShow—displays the current operating system tasks.

Synopsis

```
tsShow  [-a]
```

Parameters

```
-a 0: All Operating Systems Tasks
```

Example

The following example indicates a typical display when using the **tsShow** command.

```
MOTLoad> tsShow
Priority Identifier Status StackPtr EventPtr ErrNo     Name
00000000  00105984  01  001A8BD0  002B448C  00000000  tRoot
00000001  0011C368  04  001ACBF0  002B449C  00000000  tLogMessage
00000002  0011E850   01  001B0C10  002B44AC  00000000  tWatchDogTimer
00000004  0011FB98  02  001B88E0  002B4B4C  00000000  tTestShell
00000010  0012E878   00  001E8DC0  00000000  00000000  taskStatusShow
0000003F  00112DB8  00  002B40E0  00000000  00000000  OSTaskIdle
```

See Also

3.1.122 upLoad

Name

upLoad—uploads (sends) binary data to the host serial port from the specified memory buffer.

Synopsis

```
upLoad [-a] [-b] [-d] [-f] [-n] [-s] [-t]
```

Parameters

```
-a P*: Source Memory Address (Default = User Download Buffer)
-b Pd: Baud Rate (Default = 9600)
-d Ps: Serial-Port Device Name (Default = /dev/com2)
-f P*: Blocking Factor in Bytes (Default = Default Byte Count)
-n P*: Number of Bytes (Default = 1048576 Decimal)
-s 0 : S-Record Mode
-t Pd: Blocking Factor Delay in Ticks (Default = 0)
```

Example

The following example indicates a typical display when using the **upLoad** command.

```
MOTLoad> upLoad
```

Error Messages

upLoad(): open(<device>) failed, errno = <value>

Unable to open port.

upLoad(): ioctl(102) failed, errno = <value>

Unable to set port's baud rate.

upLoad(): ioctl(100) failed, errno = <value>

Unable to set port's configuration mode.

Device Write Failure (errno = <value>)

Write failure.

See Also

downLoad

3.1.123 version

Name

version—displays the release version ID of the MOTLoad program that is being executed.

Synopsis

```
version
```

Parameters

The following example indicates a typical display when using the **version** command.

```
MOTLoad> version
Copyright Motorola Inc. 1999-2002, All Rights Reserved
MOTLoad RTOS Version 2.0 PAL Version 1.1 RM01
Mon Mar 10 12:01:28:01:28 MST 2003
```

See Also

3.1.124 vmeCfg

Name

vmeCfg—manages user specified VME Configuration parameters. It does this by allowing the user to create/edit, show, and delete VME configuration parameters. These parameters are used at start-up time to configure the VME device. If user specified VME Configuration parameters do not exist, default values are be used instead.
Note: The VME Configuration parameters created by this utility are stored in NVRAM as Global Environment Variables.
Note: The board *must* be reset for the values set/changed by **vmeCfg** to take effect.

Synopsis

```
vmeCfg [-d] [-e] [-iPd] [-m] [-oPd] [-rPh] [-s] [-z]
```

Parameters

```
-d O : Delete User Setting
-e O : Edit/Create User Setting
-i Pd: Inbound Window Number (0-7)
-m O : Master Enable
-o Pd: Outbound Window Number (0-7)
-r Ph: Vme Chip Requester Offset (184/188/400/404/40C/F70)
-s O : Show User/Default Setting
-v O : Verbose Mode
-z O : Restore Default Settings
```

Example

The following example indicates a typical display when using the **vmeCfg** command.

```
MOTLoad> vmeCfg -e -o3
MOTLoad> vmeCfg -s -r40c
MOTLoad> vmeCfg -d -i2
MOTLoad> vmeCfg -z
```

Error Messages

PReP NVRAM header test failed

Corrupted or uninitialized GEV area in NVRAM, run getInit to correct.

3.1.125 vpdDisplay

Name

vpdDisplay—displays the MOTLoad VPD data packets from the on-board VPD SROM.

Synopsis

```
vpdDisplay [-d] [-i] [-z]
```

Parameters

```
-d Ps: Device Name (Default = Primary Onboard Device)
-i 0 : Ignore SROM Size Field
-z 0 : Data Only Mode
```

Example

The following example indicates a typical display when using the **vpdDisplay** command.

```
MOTLoad> vpdDisplay
Product Identifier : HXEB100
Manufacturing Assembly Number : 01-W3791F01A
Serial Number : 4786834
SROM/EEPROM CRC : E1998770 (&-510032016)
Flash Memory Configuration : FF FF FF FF FF FF FF FF
                           : FF FF FF FF
```

Error Messages

vpdDisplay(): open(<device>) failed, errno = <value>

Failed to open VPD SROM.

vpdDisplay(): ioctl(100) failed, errno = <value>

Unable to determine device type of SROM.

vpdDisplay(): unsupported device type

VPD device is not an SROM.

vpdDisplay(): ioctl(103) failed, errno = value

Unable to determine block size of SROM.

vpdDisplay(): ioctl(104) failed, errno = <value>

Unable to retrieve number of blocks in VPD device.

vpdDisplay(): malloc() failed

Unable to malloc an internal buffer for VPD.

vpdDisplay(): read() failed, status = <value>, errno = <value>

Read error in SROM device.

vpdDisplay(): VPD header failure (eye catcher)

VPD eye catcher doesn't match default.

vpdDisplay(): warning: VPD header failure (size)

Mismatch of size parameters for VPD.

vpdDisplay(): VPD CRC failure

VPD CRC fails.

See Also

vpdEdit

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.126 vpdEdit

Name

vpdEdit—edit the MOTLoad VPD data packets from the on-board VPD SROM. The contents of the VPD SROM are copied to a memory buffer, then a byte-by-byte editor is provided to make changes. A single period (".") terminates the edit mode, followed by a final prompt to either update or not update the VPD SROM.

Synopsis

```
vpdEdit [-d] [-n]
```

Parameters

```
-d Ps: Device Name (Default = Primary Onboard Device)
-n Ph: Number of Bytes to Read (Default = Full VPD Packet)
```

Example

The following example indicates a typical display when using the **vpdEdit** command.

```
MOTLoad> vpdEdit
Reading VPD SROM...
008C2000 4D?
008C2001 4E? 4F.
Program VPD SROM (Y/N)? y
Writing VPD SROM...  Complete
```

Error Messages

vpdEdit(): open(<device>) failed, errno = <value>

Failed to open VPD SROM.

vpdEdit(): ioctl(100) failed, errno = <value>

Unable to determine device type of SROM.

vpdEdit(): unsupported device type

VPD device is not an SROM.

vpdEdit(): ioctl(103) failed, errno = <value>

Unable to determine block size of SROM.

vpdEdit(): ioctl(104) failed, errno = <value>

Unable to retrieve number of blocks in VPD device.

vpdEdit(): malloc() failed

Unable to malloc an internal buffer for VPD.

vpdEdit(): write() failed, status = <value>, errno = <value>

Unable to write SROM.

vpdEdit(): close() failed, status = <value>, errno =

Failed to close SROM device.

See Also

vpdDisplay

Refer also to Appendix A, *MOTLoad Non-Volatile Data, on page 231*

3.1.127 wait

Name

wait—waits until all running tests have completed or specific time duration has elapsed. This command is useful to ensure that a power up test suite has completed prior to starting OS boot. It is also useful for implementing specific time delays that might be needed prior to OS startup.

Synopsis

```
wait [-n] [-t]
```

Parameters

```
-n Pd: Delay time in Seconds)
-t O:    Wait for all tests to complete
```

When neither parameter is specified, the wait command delays for 1 second.

Example

```
MOTLoad> wait -n5
(delays for 5 seconds)
MOTLoad>  wait -t
(delays until all running tests complete)
MOTLoad>  wait -n14 -t
(delays until either all tests complete or 14 seconds elapses
MOTLoad>  wait
(delays 1 second)
```

See Also

waitProbe

3.1.128 waitProbe

Name

waitProbe—waits until the probe and initialization of the I/O subsystem has completed. This is accomplished by polling a global initialization flag to be set.
Note: This is useful when performing a scripted boot; it forces a delay until the device tree has been built ensuring that the boot device has been discovered before attempting the boot process.

Synopsis

```
waitProbe [-i] [-t]
```

Parameters

```
-i Pd: Wake Up Interval in Seconds (Default = 1)
-t Pd: Time to Live in Seconds (Default = 0, Forever)
```

Example

The following example indicates a typical display when using the **waitProbe** command.

```
MOTLoad> waitProbe
Waiting for System I/O Probe to Compete...
System I/O Probe Complete
MOTLoad>

MOTLoad> waitProbe
System I/O Probe Complete
```

See Also

MOTLoad Non-Volatile Data

A.1 Introduction

Non-volatile data is stored data that remains in memory after power-down. Some of the data is meant to be permanent and fixed, while other portions can be temporary and changed. Most of the fixed or permanent data is entered by the factory, at the time the product is built, while the temporary data or variable data is entered by the user, after the product is up and running. There are three types of non-volatile data in MOTLoad:

- Vital Product Data (VPD): describes the unique characteristics of a specific board, such as marketing product number, serial number, assembly number, processor family, hardware clock frequencies, and component configuration information. Because most of the information is unique to that board, it is considered permanent, and is not usually changed by the user. Because the firmware uses certain VPD information during the boot process, changing this information can prevent the firmware from coming on-line (that means no firmware prompt) and render the board inoperable or unstable.
- Global Environment Variables (GEVs): any stored information that the user may want to define on a board-by-board basis for use from one power-up to another. Boards can operate without any GEV, but errors may occur. However, even if errors occur, or the GEV is missing, the firmware should still come on-line and display a prompt.
- Device-specific parameters, such as Serial Presence Detect (SPD) information for memory devices. This data is determined by the device itself and is stored in a private non-volatile storage device. SPD information is not described in this section, but is usually listed in an appendix in the board installation manual.

A.2 Vital Product Data (VPD) Use

This section briefly explains the purpose of VPD, and describes how to read, archive, and edit that information.

A.2.1 Purpose

The purpose of the Vital Product Data (VPD) portion of non-volatile data is to store board-specific information that is not easily retrievable from other software sources. It is considered permanent and should not be changed by a non-technical person. The information is useful during board initialization, configuration, and verification. The firmware (in this case MOTLoad) uses some of this information during the boot process. This information can also be

accessed by the user. Refer to the appendix titled “Programmable Configuration Data” in the appropriate board level installation guide for more information on the contents of this information. Refer to the remainder of this section to learn how to access and read this information.

The VPD values for a specific board are unique for that board and should not be used on any other board. Hardware and software developers, as well as factory analysis technicians, may need to change certain VPD values, but non-technical users should not, since improper modifications can degrade board operation, functionality, or prevent access to firmware prompts.

Note If a firmware prompt is not available, the Safe Start option should be used to bring up a prompt on the system console, from which the VPD can be manually restored.

A.2.2 How to Read VPD Information

VPD information is stored in a fixed address portion of memory, usually SROM or EEPROM. It can be viewed by entering the following MOTLoad command:

```
vpdDisplay
```

If the VPD is valid, `vpdDisplay` provides a formatted output of all the VPD packets in the SROM. The VPD Specification should be referenced to determine the meaning of each field of the various packet types.

For most hardware products, the following elements are defined at the factory:

- Product Identifier (for example, HXEB100-101)
- Manufacturing Assembly Number (for example, 01-W3822F01)
- Serial Number (of the assembled board product)
- Processor Family Number (for example, 7410)
- Hardware clock frequencies (for example, internal, external, fixed, PCI bus)
- Component configuration information (for example, connectors, Ethernet address(es), other addresses, Flash bank ID, L2 or L3 cache ID)
- Security Information (VPD type, version and revision data, 32-bit CRC protection)

A.2.3 How to Archive VPD Information

Even though VPD information should not be altered by the typical user, there may be a need to do so. If that is the case, the following procedure should be followed.

Prior to modifying any elements of VPD, create an archive copy of the initial VPD contents. The archive copy can be used later to restore the VPD to its original state, if necessary.

The procedure below illustrates how to archive the current VPD contents. (More detailed explanations of the syntax of these commands are available elsewhere in this manual.)

1. Read the VPD into the default user area of memory with a command similar to:
   `sromRead –d/dev/i2c0/srom/A8 –n400`
2. Create a file of it with a command similar to:
   `tftpPut –n0x400 –c`*`BOARD_IP_HERE`* `–f`*`path_and_filename`* `–d/dev/enet2 –s`*`SERVER_IP_HERE`*

Note The command lines shown above must be customized for the board being used. The VPD SROM device string passed to sromRead must match the board. The Ethernet device string must also be for that board, as well as the IP addresses being used. The –n (size) option should match the MOTLoad SROM size, which is defined by the Vital Product Data Specification.

The resulting file (*path_and_filename*) will be a binary file whose length is determined by the –n (size) option. Save this binary file; it can be used later to restore the board VPD if necessary.

A.2.4 Restoring the Archive

As mentioned in the previous section, prior to modifying any elements of VPD, an archive copy of the initial VPD contents should be created (see previous section for instructions). This archive can be used to restore VPD to its previous contents, if necessary.

Extreme care must be taken when writing to the VPD SROM. Incorrect VPD values can prevent a board from reaching the MOTLoad command prompt. If this occurs, Safe Start, a jumper option on some hardware products, should be used.

The following sequence illustrates how to restore the archived VPD contents. (More detailed explanations of the syntax of these commands are available in Chapter 3, *MOTLoad Commands, on page 35*.)

```
tftpGet –n0x400 –c<BOARD_IP_HERE> –f<path_and_filename>
  –d/dev/enet2 –s<SERVER_IP_HERE>

sromWrite –d/dev/i2c0/srom/a8 –n400
```

Note The command lines shown above must be changed to reflect the specific board being used. The VPD SROM device string passed to sromWrite needs to match the board. The Ethernet device string needs to be appropriate for the board, as do the IP addresses being used. It is very important to use the data file for the exact board to which the restoration is being done. The –n (size) option should match the MOTLoad SROM size, which is defined by the Vital Product Data Specification.

A.2.5 Editing VPD

The MOTLoad `vpdEdit` command allows VPD to be interactively edited. Ensure that the proper safeguards have been put in place prior to editing VPD. For example, the VPD should be both understood, and archived, prior to applying any changes. Incorrect VPD values can prevent a board from reaching the MOTLoad command prompt. If this occurs, Safe Start, a jumper option on some hardware products, should be used.

The edit session prompts the user with each byte currently in VPD, and the user has the option of changing the byte by typing in a new value (a byte in hexadecimal), or the user can keep the existing value by entering a carriage return. The meaning of each byte of data can be determined by studying MOTLoad's Vital Product Data Specification.

The following edit session entries have special meaning:

^ (caret) - reverse edit order. This is helpful if the byte needing to be changed has been passed up during the edit session.

v (lowercase v) - edit in "normal" order again. This is handy after having used the ^, described above.

. (period) - stop editing and query user as to whether edits are to be saved in SROM.

Here is an example of an edit session. Note that the addresses increment until the ^ is entered, then decrement until the "v" is entered.

> vpdEdit

```
00A67000 4D?
00A67001 4F?
00A67002 54?
00A67003 4F?
00A67004 52?
00A67005 4F? ^
00A67004 52?
00A67003 4F?
00A67002 54? v
00A67003 4F?
00A67004 52?
00A67005 4F? .
```

Program VPD SROM (Y/N)? n

If the `Program VPD SROM (Y/N)?` question is answered affirmatively, the edits are written to the VPD SROM. A new checksum is also calculated and written. Answering negatively prevents any change to the existing SROM contents.

A.3 Global Environment Variables (GEVs)

Global Environment Variables (GEVs) are used to store nearly any value for later retrieval, even after loss of power or hardware reset. Each value saved needs a unique label, the label being defined at the same time as the value. Global Environment Variables in MOTLoad are based loosely on the GEV concept presented in the PReP Specification. However, MOTLoad does not claim compliance to that specification.

GEVs are typically stored in NVRAM. MOTLoad requires 8K bytes at the top end of NVRAM. The amount of space set aside in the NVRAM for storage of GEVs is 3592 bytes.

Note: in safe-start mode, MOTLoad ignores all GEVs.

A.3.1 Initializing the GEV Storage Area

The gevInit command is used to initialize the GEV area of the NVRAM device. Execution of this command deletes all currently defined GEVs, and prepares the GEV area for its first variable. This command should be used with caution, as re-entry of all removed GEVs (as with gevEdit) can be time-consuming.

HXEB100> gevInit

```
Initialize Global Environment Area of NVRAM
Warning: This will DELETE any existing Global Environment Variables!
Continue? (Y/N)?
```

Entering a y or Y deletes all GEV labels and values. Any other answer preserves the GEV area.

A.3.2 Reserved GEVs

The MOTLoad firmware reserves several GEV names for the invoking of special features. MOTLoad's approach to configuration and environment variables storage is simple. There are no predefined locations (within the storage area) for each of the possible variables. Each variable is defined by an identifier string. All variables are basically ASCII strings terminated by a null character. This format of ASCII null terminated strings was utilized by PReP (PowerPC Reference Platform) based computer systems. The name of these parameters is Global Environment Variables (GEV).

Below is a list and the features in which the GEV is associated.

A.3.2.1 Startup GEVs

The reserved startup GEVs are:

mot-script-boot

This GEV is basically a script that is executed upon start-up. The contents of this script is any combination of commands or tests that can be executed from the command line. This script allows the user to automate the process of testing and booting.

mot-script-delay

The value associated with this GEV is the time in seconds the boot process will wait for the user to have the opportunity to cancel the Startup Script. If this GEV is not defined the default wait time is 7 seconds. This GEV is only used if the mot-script-boot has been defined.

mot-boot-fail-led

If this GEV is set to the string “off”, the board fail LED will not be illuminated at OS startup. By default, MOTLoad illuminates the board fail LED prior to transferring control to the OS. If this LED behavior is undesired, the user may use the mot-boot-fail-led to change it.

mot-noprobelist

This GEV provides the user with a means to exclude PCI devices from MOTLoad's IO probing. Excluding the devices that are not needed for booting the OS will reduce the time needed for MOTLoad to finish its IO probing task. (See the `waitProbe` command for more information.)

The mot-noprobelist GEV specifies each PCI device to exclude as "businstance,busnumber,devicenumber,functionnumber". Values are specified as decimal numbers. Multiple PCI devices may be excluded by use of the ':' as a separator.

Examples:

mot-noprobelist="1,12,5,2" would exclude the PCI device at bus intance = 1, bus number=12, device number=12, function=2 from the MOTLoad IO probe.

mot-noprobelist="0,3,1,0:1,2,3,0:0,7,2,3" would exclude three PCI devices from the MOTLoad IO probe.

To determine the PCI device bus instance, bus, device, and function numbers of the various PCI devices in the system, the `pciShow` command can be used.

mot-passwd

The mot-passwd GEV allows the user to specify a MOTLoad password. If this GEV is set, then MOTLoad will require the user to enter the password before allowing access to the MOTLoad command line. By default, MOTLoad does not require the user to enter any password.

Note: If the MOTLoad password is forgotten, the administrator can reset it by configuring the board HW for safe start mode and then using `gevInit` and/or `gevEdit` to reset the passwd to a known state.

bootargs

The bootargs GEV allows the user to specify a string that MOTLoad will pass to the booted OS. Actual use is OS dependent but normally the OS (e.g. Linux) will use the string as the default kernel command line.

Note: The value of bootargs does not affect MOTLoad operation in anyway. It merely is a string that is passed to the OS when the OS is started.

Note: At the current time, MOTLoad only supports the bootargs GEV on the MVME3100 and MVME7100 boards. On all other boards, MOTLoad ignores the bootargs GEV.

A.3.2.2 Network GEVs

The following reserved GEVs are updated with their respective information after a successful network boot (netBoot). If these GEVs do not currently exist, they will be created.

mot-boot-cipa	Client IP Address (Decimal Dot Notation)
mot-boot-sipa	Server IP Address (Decimal Dot Notation)
mot-boot-gipa	Gateway IP Address (Decimal Dot Notation)
mot-boot-snma	Subnet IP Address Mask (Decimal Dot Notation)
mot-boot-file	Name of File that was Loaded
mot-boot-device	Name of Device (Interface Node)

The following GEVs can be used in substitution of the command line options on network commands. The /dev/enet0 portion of the variable may be any network interface present in the system. The presence of the device node indicates MOTLoad support (that is, the associative driver is packaged with the executable binary and has been initialized/instantiated). If netBoot was used to boot the board, the following GEVs will also be updated. To skip the automatic GEV variable update, use the -u option on the command line.

mot-/dev/enet0-cipa	Client IP Address (Decimal Dot Notation)
mot-/dev/enet0-sipa	Server IP Address (Decimal Dot Notation)
mot-/dev/enet0-gipa	Gateway IP Address (Decimal Dot Notation)
mot-/dev/enet0-bipa	Broadcast IP Address (Decimal Dot Notation)
mot-/dev/enet0-snma	Subnet IP Address Mask (Decimal Dot Notation)
mot-/dev/enet0-file	Name of File to Load (Get)

For example:

MOTLoad> tftpGet –d/dev/enet0

This command uses all GEVs for command line options, and if the GEV is not defined, the standard defaults are used.

A.3.2.3 Console Configuration GEV

There is one reserved GEV.

mot-consolePort=<*baud*>,<*parity*>,<*stop*>,<*bits*>

where:

baud is one of the following values: 2400, 4800, 7200, 9600, 19200, 38400, 57600, 115200, 128000, or 256000. If any other value is present, the baud rate is 9600.

parity is one of the following values: N, E, or O; representing NONE, EVEN, or ODD respectively.

stop is either 1 or 2. All other values for stop bits are ignored.

bits is either 7 or 8. All other values for byte size are ignored.

mot-consolePort settings are ignored if SafeStart has been set.

A.3.2.4 Disk Boot Option GEV

There is one reserved disk boot option GEV.

mot-boot-path

This GEV may specify multiple boot paths. A path consists of a device name, a partition number, and a file name. For some disk boot media formats, the partition number and file name are not required. This would be the case for PReP-formatted boot media.

When specifying multiple boot paths, a colon character must be used to separate the individual boot paths. For example:

/dev/fd0\1\\boot.bin:/dev/ide0/hdisk0\1\\boot\os.bin

A.3.2.5 Boot Results GEV

There is one reserved boot results GEV.

mot-boot-device

This GEV is updated with either the name of the boot path in which a successful boot (load) was accomplished or the device name of the successful network boot. For example:

/dev/ide0/hdisk0\1\\boot\os.bin

A.3.2.6 IDE GEV

There are two reserved IDE GEVs.

mot-/dev/ide*%d*-mask

This GEV controls the channel and device selection of the Legacy or Serial ATA probing sequence. This GEV is in the form mot-/dev/ide*%d*-mask, where *%d* is the device instance; for example, mot-/dev/ide0-mask. MOTLoad expects hexadecimal data as input into this GEV. Each bit field denotes which device to probe as shown below:

mask = 0x1: channel 0 device 0
mask = 0x2: channel 0 device 1
mask = 0x4: channel 1 device 0
mask = 0x8: channel 1 device 1

MOTLoad uses a default value of 0xFFFFFFFF for the channel mask, which causes MOTLoad to probe all possible IDE channels.

mot-/dev/ide*%d*-timeout

This GEV controls the time-out value of detecting a Legacy or Serial ATA device. This GEV is in the form mot-/dev/ide*%d*-timeout, where *%d* is the device instance; for example, mot-/dev/ide0-timeout. MOTLoad expect decimal data in seconds as input into this GEV. MOTLoad does not limit input to a particular range. If a user enters erroneous data, the user could recover through safe-start mode if MOTLoad is in a prolonged wait-probe state. If the CLI is available, the user could recover by setting the time-out to the desired value. MOTLoad uses a default value of 2 seconds for the IDE-detection time-out.

A.3.2.7 SCSI GEV

There are two reserved SCSI GEVs.

mot-/dev/scsi*%d*-mode

This GEV controls the host mode; that is, initiator or target, of the SCSI host controller. This GEV is in the form mot-/dev/scsi*%d*-mode, where *%d* is the device instance; for example, mot-/dev/scsi0-mode. MOTLoad expects a character value of t as input into this GEV. MOTLoad uses the t character to identify the SCSI device as a target device. MOTLoad identifies the SCSI device as an initiator device by default.

mot-/dev/scsi%d-id

This GEV controls the device ID of the SCSI host controller. This GEV is in the form mot-/dev/scsi*%d*-id, where *%d* is the device instance; for example, mot-/dev-scsi0-id. MOTLoad expects decimal or hexidecimal data as input into this GEV. MOTLoad uses a default value of 7 for the device ID of an 8-bit (narrow) SCSI initiator device. MOTLoad uses a default value of 15 for the device ID of a 16-bit (wide) SCSI initiator device. If the SCSI device is a target device and the device ID is not specified, MOTLoad resets the device ID to 0.

A.3.2.8 Test Suite GEVs

Use the example below to retrieve and invoke a saved test suite.

xxxxxxxxx

Users may save a test suite to non-volatile RAM for later use. `testSuiteMake` creates a user-defined suite of commands in memory that are not preserved across resets. By creating a GEV with the desired test commands, a test suite can be created and retrieved across resets. The GEV must contain more than one test to be performed. For example:

```
MOTLoad> gevEdit  gevTestSuite
(Blank line terminates input.)
<commands or tests>

Update Global Environment Area of NVRAM (Y/N)? Y
```

```
MOTLoad> testSuiteMake  –ngevTestSuite  –r
1 <user specified test 1>
2 <user specified test 2>
   ...
n <user specified test n>

MOTLoad> testSuite  –ngevTestSuite

MOTLoad>
```

The first step, creation of the GEV gevTestSuite, only needs to be done once.

A.3.2.9 Creating a Configurable POST (Power On Self Test)

Each time startup occurs, the POST commands are displayed. However, they will run in the background.

1. Define the POST using a GEV:
   MOTLoad> gevEdit –nPOST
   Test1 for POST
   Test2 for POST
   Test3 for POST
2. Define the mot-script-boot GEV:
   MOTLoad> gevEdit –nmot-script-boot
   testSuiteMake –nPOST –r (This creates a test suite from what is stored in NVRAM)
   testSuite –nPOST –r (This runs the test suite in the background)

To find out if post has passed, use the testStatus command.

A.3.2.10 Other GEVs

There are other GEVs that are reserved by MOTLoad firmware. All of these GEVs begin with the mot- prefix. These GEVs should not be changed through the gevEdit command. The additional GEVs can be edited through other MOTLoad commands. The GEVs are used for VMEbus setup and serial port configurations.

A.3.3 Viewing GEV Values

All GEVs currently stored in NVRAM may be viewed with the gevShow command. The order of the GEVs is the order in which they were created. Each GEV is shown as *label=value*. If the value is comprised of more than one line of data, the label is shown on a separate line, above the value line(s).

```
gevShow
example1=Hi 12345 Hi
example2=Come Back Soon
jazz=
a
b
c
e
d
g
e
t
lkjkj
jsjs
ieie
vnvnv
s’s’s’s
c

apple=apple GEV
jazz3=short jazz3
example3=August 7, 2002
Total Number of GE Variables =6, Bytes Utilized =160, Bytes Free =3432
```

A.3.4 Viewing GEV Labels

The labels of all currently-defined GEVs can be listed with the gevList command. The order of the GEVs are in the order in which they were created as:

```
gevList
example1
example2
jazz
```

```
apple
jazz3
example3
Total Number of GE Variables =6, Bytes Utilized =160, Bytes Free = 3432
```

A.3.5 Creating GEVs

The `gevEdit` command is used to create a new GEV. Execute `gevEdit`, and provide a label name which is currently not used, as in this example of a GEV labeled example3 with a value of August 7, 2003:

> gevEdit example3
(Blank line terminates input.)
August 7, 2003

Update Global Environment Area of NVRAM (Y/N)? Y

GEV labels can be up to 255 bytes long. The label itself is stored in NVRAM, along with the GEV value. Therefore, as GEV space is limited, users are encouraged to select labels of appropriate length.

GEV values are stored as ASCII strings, which may be up to 511 bytes long.

GEV labels and values are both case-sensitive.

If there is insufficient space remaining for storage of the new GEV, a message similar to the following is displayed:

```
Not all variables were copied, 1 remaining
```

The newly-added variable is not added, even if the “Update Global Environment Area of NVRAM (Y/N)? “question is answered affirmatively.

A.3.6 Editing GEVs

The gevEdit command is used to modify the value of an existing GEV. Simply execute `gevEdit`, and provide the label of the GEV to be modified, as:

```
gevEdit example2

example2-goodbye 54321 goodbye
(Blank line terminates input.)
Come Back Soon.
```

Update Global Environment Area of NVRAM (Y/N)? Y

Entering y or Y replaces the original GEV value with the new. Any other answer preserves the original GEV.

A.3.7 Deleting GEVs

To remove a GEV from NVRAM, use the `gevDelete` command, and provide the GEV label, as:

```
gevDelete jazz2

jazz2=
jsjsjs
sjjsjs
eieieie
82828282
xxxxx
```

Update Global Environment Area of NVRAM (Y/N)? Y

Entering y or Y deletes the GEV label and value. Any other answer preserves the GEV.

When a GEV is deleted, its label can be reused. Also, the NVRAM space which was used to store both the deleted label and value is made available by the deletion.

B.1 Introduction

This appendix describes the remote interface provided by MOTLoad to the host CPU via the backplane bus. This interface allows the host to obtain information about the target board, download code and/or data, modify memory on the target, and execute a downloaded program.

Note:

- This feature is not present in all products that may be using MOTLoad.
- Code may also be downloaded to the target via other methods, and then executed using Remote Start. Other download methods may be faster than using the Remote Start interface and may be preferable to use for large downloads.

B.2 Overview

MOTLoad uses one 32-bit location as the Inter-Board Communication Address (IBCA in this document) between the Host and the Target. This location is typically a register in the backplane bridge device. The address of the IBCA is defined in the board product's Installation and Use Manual, along with other board-specific Remote Start information. The IBCA is divided into the following five sections:

- An ownership flag when set, indicates that the host "owns" the ICBA and is free to write a new command into it. It also indicates that the previous command, if any, has been completed and the results, if any, have been provided. When the host writes a new command to the ICBA, it must clear the ownership flag to indicate to the target that the ICBA contains a command to be processed.
- A ’command opcode’. This is a numeric field that specifies the command the host wants to be performed.
- An error flag, which is used to provide command completion status from the Target to the Host.

- A 'command options' field. This field further qualifies the specifics of the command to be performed. The meaning of the option field is specific to each command opcode.
- A command data and result field. This field provides the data, if any, needed by the command and provides the response from the Target upon command completion. The meaning of the bits in this field are specific to each command opcode.

Additionally, certain commands require more information than can be contained within the data and result fields of the ICBA. To provide this information, the interface provides four "virtual" registers. The contents of these virtual registers are used in certain commands. The contents of the registers can be read and written via Remote Start commands. The virtual registers are identified as VR0, VR1, VR2 and VR3.

After board reset, the ICBA is written with a specific reset pattern, "RST", in the lower 24 bits. The "host owns" bit is also set. This indicates that the target CPU has been reset and is ready to accept commands.

MOTLoad uses certain areas of memory and I/O devices for its own operation. This interface allows the host CPU to write and read any location on the target CPU bus, including those in use by the firmware. Host software can avoid overwriting memory which is in use by the firmware by using the allocate memory and the firmware /payload query commands. Overwriting target locations in use by the firmware may result in erratic behavior of the target.

B.2.1 Inter-Board Communication Address Description

MOTLoad uses one 32-bit location as the Inter-Board Communication Address (IBCA in this document) between the Host and the Target. The address of the IBCA is provided in the board's Installation and Use Manual.

Note In the IBCA description, and the following command descriptions, references to the upper half of the register refer to bits 0 through 15, and references to the lower half of the register refer to bits 16 through 31.

Big Endian format of Inter-Board Communication Address:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
OWN	Command opcode							ERR	Command Options							Command Data/Result															

At reset, hardware clears this register. After reset, MOTLoad writes this register with the value 0x80525354 (RST). This value indicates that a reset event has occurred and the interface is ready to accept commands.

Note For boards that use a Little Endian backplane bridge, such as a PCI-to-VME bridge, or a PCI-to-PCI bridge, the values written to the IBCA will need to be byte-swapped. (See *Demonstration of the Host Interface* on page 258, for an example of a PCI-to-VME bridge device.)

Bit 0

The ownership flag (OWN). A value of 1 indicates the 'host' owns the IBCA. A value of 0 indicates that the target CPU owns the IBCA.

Note: It is critically important that only the owner of the IBCA write to it. The Remote Start interface may deadlock if a non-owner changes the value of the IBCA

Bits 1–7

7 bit command opcode field. The following values are valid:

Opcode 0x01: Write/Read Virtual Register
Opcode 0x02: Initialize Memory
Opcode 0x03: Write/Read Memory
Opcode 0x04: Checksum Memory
Opcode 0x05: Memory Size Query
Opcode 0x06: Firmware / Payload Query
Opcode 0x07: Execute Code
Opcode 0x08: Allocate Memory

Each command is described in more detail in following sections.

Bit 8

Global error status flag (ERR). If the command completed successfully, then this bit is written by the firmware with the value 0 at command completion. If the command fails, it will be written with the value 1. Additional command specific error status may be returned in other fields of the IBCA.

Bits 9–15

7 bit command option field. Each command specifies the particular meaning of each of the command option bits. Option bits that are unused are considered reserved and should be written to 0 to ensure compatibility with future implementations of this interface.

Note: For most commands, bit 9 is used to specify verbose/non verbose mode target command processing. In verbose mode, command related information is printed on the target console as the host command is processed. Verbose mode is selected when bit 9=0, non-verbose mode is set when bit 9=1.

Bits 16–31

16 bit data/result field. When a command is sent to the target, these bits may contain command-specific data for the target. The target will use the same field for returning command results to the host. The meaning of this field is specific to each command opcode. Error codes have the same meaning across all commands. Refer to Table B-1 on page 256 for Remote Start error code definitions.

B.2.2 Opcode 0x01: Write/Read Virtual Register

This command allows the host to read and write the contents of any of the four virtual registers. The specific operation (write or read) and the "register" to be accessed are determined by the command options field.

Write data is contained in the command data field. Read data is returned in the result field.

Note: It takes two writes to completely modify all 32 bits of a Virtual Register, as well as two reads to completely read one.

Command option bits affect the operation as follows:

- Bit 15 indicates read (0) or write (1) operation
- Bit 14 indicates whether to access either the lower half (0) or upper half (1) of the virtual register.
- Bits 11 & 12 specify which virtual register is to be accessed (0b00 = VR0, 0b01 = VR1, 0b10 = VR2, 0b11 = VR3).

B.2.3 Opcode 0x02: Initialize Memory

This command allows the host to initialize, with a single byte pattern, areas of target RAM without incurring the overhead of writing each location via the Remote Start write memory command.

The command options field is unused and must contain 0.

The lower 8 bits of the data field need to contain the byte pattern to be written.

Memory starting at the address contained in VR0 and the byte count contained in VR1 is initialized with the value contained in the lower 8 bits of the data field.

Note: This command does not guarantee that the memory is initialized using any particular ordering or alignment. Do not use it to initialize any area of memory that has alignment or ordering requirements (for example, device registers).

B.2.4 Opcode 0x03: Write/Read Memory

This command allows the host to Read or Write individual address locations on the target's address bus. Data sizes of 8, 16, and 32 bits are supported. The specific operation and size are determined by the command options field.

Note Verbose mode target command processing is not available with this command; command register bit 9 is ignored.

- The data to be written is specified in the data field. If the options specify 32 bit writes, then the upper half of VR1 sources the upper 16 bits of the data (that means, the data field can only provide the lower 16 bits). On reads, the read data is 0 extended to 32 bits and is stored in VR1. The lower 16 bits of VR1 are returned in the result field.
- The address to be used for the access is taken from VR0. Command option bits affect the operation as follows:
  - Bit 15 indicates read (0) or write (1) operation.
  - Bit 14 indicates whether to auto-increment VR0 after the access is performed. If 0, the contents of VR0 is unaffected by this command. If 1, the contents of VR0 is incremented by 1, 2, or 4 depending on the size of the access.
    The auto increment feature may be used during downloads of sequential data to avoid the overhead of issuing an additional write virtual register command after each datum is written.
  - Bits 12 and 13 specify the size of the access. 00 indicates an 8 bit, 01 indicates a 16 bit and 10 indicates 32 bits.

B.2.5 Opcode 0x04: Checksum Memory

This command calculates a 16 bit checksum over a specified range of target addresses. The checksum algorithm used is specified at the end of this chapter in the section titled R*eference Function: srom_crc.c*. The checksum is returned in the result field. The Checksum Memory command is useful for determining whether a download image is intact without incurring the overhead of reading each location in the image using the memory read command.

- The starting target address of the area to checksum is taken from VR0.
- The number of bytes to checksum is taken from VR1.

B.2.6 Opcode 0x05: Memory Size Query

This command allows the host to determine the size and target-local address of target memory. A series of two commands is necessary, one to provide the beginning memory address on the target, another to determine

the ending address. The addresses are each stored in VR1, which may then be read using the read virtual register command.

The options field specifies specifics of the command as follows:

- Bit 15 specifies whether to return information about the actual (0) or available (1) target RAM. Information about the actual target RAM does not take into account the areas of RAM that the firmware is using. Information about the available RAM will return values which reflects the area of RAM which the firmware is not using.

Note: Memory allocated by the allocate memory Remote Start command is considered "used" by the target firmware.

- Bit 14 specifies whether to return the beginning (0) or ending address (1) of the RAM.

B.2.7 Opcode 0x06: Firmware/Payload Query

This command allows the host to access details of various hardware components present on the board, as well as the firmware revision. A board payload structure (struct bdPayload, below) will be written to the target address provided in VR1 by the host.

VR1 contains the address (as viewed from the target's processor) to which the payload structure will be written.

The host must ensure that the address in VR1 is allocated via Opcode 0x08, Allocate Memory, prior to calling the Firmware / Payload Query command. The size of the allocation must be sufficient to contain the *bdPayload* structure. Upon completion of the command, the host could use Opcode 0x03, Write/Read Memory, to copy the structure from the target to the host.The options field is unused and must contain 0.

```
/*
* This structure defines the organization of pci data that's *returned by
the Remote Start Firmware Query command.
/*
typedef struct pciPopulation {
unsigned char busInstand;
unsigned char bus;
unsigned char device;
unsigned char function;
unsigned short vendorID;
unsigned short deviceID;
```

```
unsigned char class;
unsigned char subClass;
unsigned char unused[6];
}pciPopulation_t;
/*
*This structure defines the organization of board payload *information
that's returned by the Remote Start Firmware *Query command.
*/
typedef struct bdPayload {
char processorType[16]; /*offset0 */
char boardType[32]; /* offset 9x10 */
char boardAssy[32]; /* offset 0x30 */
double memTotal; /* offset 0x50 */
double memAvail; /* offset 0x58 */
char os_major; /* offset 0x60 */
char os_minor; /* offset 0x61 */
char fw_major; /* offset 0x62 */
char fw_minor; /* offset 0x63 */
unsigned short numCPU; /* offset 0x64 */
unsigned short numPciDevs; /* offset 0x66 */
unsigned char unused[8]; /* offset 0x68 */
/*
* Assuming all busses are 33mhz, allow room for 10 devices,
* 8 func per device, on each PCI bus on board.
*/
} bdPayload_t;
```

Note In the bdPayload structure, the NUM_PCI_INSTANCES value should be set to the number of PCI Bus Instances on the target board to match the generous estimate of the number of possible pciPopulation_t entries used by MOTLoad. A PCI bus instance is an independent PCI bus, not to be confused with a PCI subbus, which could exist as a child of a PCI bus instance. (Sub-bus devices are not reported by the Firmware Query / Payload command.) The actual number of pciPopulation_t entries is very likely to be fewer than the generous estimate; the actual number is dynamically determined and provided by the target firmware in the numPciDevs element.

B.2.8 Opcode 0x07: Execute Code

This command allows the host to cause the target CPU to transfer control to a specific execution address on the card. The `execProgram` command, documented in the Commands section of this manual, is executed on the target by Remote Start to facilitate the transfer of control.

- VR0 contains the address (as viewed from the target's processor) to begin execution at.
- VR2 contains the value that is loaded into CPU register R3 when control is transferred to the execution address, that is, it is an argument for the executable code.
- The state of CPU registers R0 through R2, and R4 through R31 are indeterminate when control is passed to the address.

Note This command does not return. The OWN flag bit in the IBCA remains clear.

B.2.9 Opcode 0x08: Allocate Memory

This command allows the host to allocate memory on the target using the target firmware's available memory pool.

- VR0 contains the number of bytes to allocate
- VR2 contains the alignment of the allocation, which must be a power of 2
- The starting address of the allocated memory on the target will be provided in VR1

Note It is important to verify that the response from the target does not indicate an error. If the allocation fails for some reason, the ERR bit will be set, and the Allocation Failed error code will be provided, along with a 0 in VR1. Use of the returned 0 as the start address of an allocated area is not recommended.

Note There is no way to "free" memory allocated with this command, except by resetting the board.

B.2.10 Remote Start Error Codes

These are the 16-bit values that the target board returns in the Data/Result field of the IBCA when the target board detects an error in the processing of a host command. These error codes are valid only if the ERR bit was set in the IBCA.

Table B-1 Command/Response Error Codes

Error Code	Associated Opcode: Command	Definition of the Error Code
0x0001	0x03:Write/Read memory	Illegal access size requested
0x0002	n/a	Unsupported command opcode requested
0x0003	Allocate Memory	Allocation failed

B.2.11 VME Remote Start

Remote Start in a VME chassis adheres to the protocol defined throughout this chapter. In addition, several Global Environment Variables (GEVs) control various aspects of VME Remote Start. These GEVs are stored in NVRAM, and may be accessed with standard MOTLoad GEV utilities (gevEdit, gevShow, gevDelete, gevList). Note that GEVs are always case-sensitive, so they must be provided exactly as shown, below. The GEVs, and their meanings, are:

- `mot-vmeRemoteStartMBox`

  This GEV selects which VME bridge device mailbox is used as the Inter Board Communication Address (IBCA). Valid values are 0 - 3. The default mailbox is mailbox 0. If the GEV is missing, or set to an invalid value, the default mailbox is used.

- `mot-vmeRemoteStartOff`

  This GEV allows the user to disable Remote Start for the VME board. When Remote Start is disabled, the board will not modify or monitor the IBCA for Remote Start commands. If the GEV does not exist, remote start services will be provided. If the GEV does exist, but is set to a value of 0, remote start services will be provided. All non-zero values of `mot vmeRemoteStartOff` GEV will disable remote start services.

VMEbus interrupts are not generated by the Remote Start feature. The host should poll the IBCA OWN bit to determine if a command has completed, and not write to the IBCA unless the OWN bit is set.

The target processor will receive an interrupt each time the target's IBCA is written by the host. Although it is most efficient if the host writes the entire command word in a single VME write, it is acceptable to build a command in incremental fashion, as long as the OWN bit is cleared in the very last write. The target will process the command when the OWN bit is cleared; no other action is required by the host.

The VMEbus address of the VME Bridge mailbox register is controlled by the VME configuration of the board. This is documented in the board's Installation and Use Manual.

If the VME Bridge converts from PCI to VME, then the IBCA will be viewed in a byte-swapped order from the processor. Therefore, the bit orders shown in this chapter will need to be byte-swapped when viewed directly using MOTLoad. For instance, the IBCA after reset is said to contain the "RST" flag as, 0x80525354. However, when viewed from the processor's perspective using MOTLoad's mdw command, the "RST" flag is: 0x54535280. See *Demonstration of the Host Interface* on page 258, below, for detailed examples of this.

B.2.12 CompactPCI Remote Start

Remote Start in a CompactPCI chassis adheres to the protocol defined throughout this chapter. The Intel 2155x PCI-to-PCI bridge device Scratch 7 register is used as the Inter-Board Communication Address (IBCA). The Intel 2155x Secondary Doorbell 0 is used to notify the target of a command to be processed.

PCI interrupts are not generated onto the Compact PCI backplane by the Remote Start feature. The host should poll the IBCA OWN bit to determine if a command has completed.

The PCI address of the PCI-to-PCI Bridge Scratch7 and Doorbell register is controlled by the PCI configuration of the board.

Issuing a Remote Start command is a three step process. In the first step, the host ensures the OWN bit is set in the IBCA. In the second step, the 32-bit command opcode is written by the host to the IBCA. In the third step, the host notifies the target that a command is waiting by writing a 16- bit value, with the Secondary Doorbell 0 bit set, to the Secondary Interrupt Request register. The target will respond to the doorbell interrupt, clear the Doorbell 0 request, and set the OWN bit in the IBCA. The host should poll the OWN bit, and ensure it is set, prior to writing another opcode.

The IBCA, which exists in PCI space, will be viewed in a byte-swapped order from the processor. Therefore, the bit-orders shown in this chapter will need to be byte swapped when viewed directly using MOTLoad. For instance, the IBCA after reset is said to contain the "RST" flag as, 0x80525354. However, when viewed from the processor's perspective using MOTLoad's mdw command, the "RST" flag is: 0x54535280. See *Demonstration of the Host Interface* on page 258, for detailed examples of this.

B.2.13 Demonstration of the Host Interface

The following example demonstrates the use of MOTLoad's Remote Start capability in an VME system. In this example, Remote Start is used to allocate a 1 megabyte memory range to the host by the target. Following allocation, the memory on the target is initialized via Remote Start by the host. Both the host and the target are MVME5500 boards. Each section is demarked with "TARGET-" or "HOST-".

The board that is being "remotely started" is referred to as the Target. The board that is initiating the remote start action is referred to as the Host.

Note that an outbound window needs to exist on the Host. This window will allow the Host to access (read/write) the Inter-Board Communication Address (IBCA) on the Target. In this example, the Target's IBCA is mapped to 0xa267f348 on the Host. Please see the *Installation and Use Manual* for the boards, for more information regarding the mapping and the actual register used for ICBA.

Note that the IBCA in this example is accessed through PCI, so the values being provided in the mmw commands are byte-swapped when compared to the IBCA description earlier in this chapter.

HOST – store the Target's IBCA address into a variable to make things easier:

```
MOTLoad> IBCA = a267f348
return = A267F348 (&-1570245816)
errno = 00000000
```

HOST – ensure the Target is ready (OWN bit set)

```
MOTLoad> mdw -aIBCA -c1
A267F348 54535280
```

HOST – allocate 0x100000 target memory for the image, aligned on 4-byte boundary:

Important: Ensure the OWN bit is set prior to each modification of the IBCA!

HOST – write lower half of size into VR0:

```
MOTLoad> mmw -aIBCA
A267F348 54535280? 00000101
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0000 to lower half of vr0"
```

HOST – write upper half of size into VR0:

```
MOTLoad> mmw -aIBCA
A267F348 00000181? 10000301
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0010 to upper half of vr0"
```

HOST – write lower half of alignment into VR2:

```
MOTLoad> mmw -aIBCA
A267F348 10000381? 04001101
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
Remote Start: host wrote 0004 to lower half of vr2
```

HOST – write upper half of alignment into VR2:

```
MOTLoad> mmw -aIBCA
A267F348 04001181? 00001301
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
Remote Start: host wrote 0000 to upper half of vr2
```

HOST – send allocate memory command:

```
MOTLoad> mmw -aIBCA
A267F348 00001381? 00000008
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will approximate:

```
"Remote Start: allocate memory
number of bytes=00100000, alignment=00000004
Remote Start: allocate memory: address=01920000"
```

HOST – Initialize the allocated memory on the target to a pattern using Remote Start Initialize Memory (Opcode 2).

HOST – write lower half of target memory starting address into VR0:

```
MOTLoad> mmw -aIBCA
A267F348 92010381? 00000101
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0000 to lower half of vr0"
```

HOST – write upper half of target memory starting address into VR0:

```
MOTLoad> mmw -aIBCA
A267F348 00000181? 92010301
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0192 to upper half of vr0:
```

HOST – write lower half of the byte count into VR1:

```
MOTLoad> mmw -aIBCA
A267F348 92010381? 00000901
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0000 to lower half of vr1"
```

HOST – write upper half of the byte count into VR1:

```
MOTLoad> mmw -aIBCA
A267F348 00000981? 10000b01
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0010 to upper half of vr1"
```

TARGET – View the memory that is going to be initialized:

```
MOTLoad> mdw -a01920000 -c4
MOTLoad> mdw -a01a1fff0
```

HOST – Send the Initialize Memory command:

```
MOTLoad> mmw -aIBCA
A267F348 10000B81? 5a000002
A267F34C 00000000? .
```

TARGET – Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: initialize memory:
address=01920000, byte count=00100000, data=5A"
```

TARGET – View the memory that was initialized:

```
MOTLoad> mdw -a01920000 -c4
01920000 5A5A5A5A 5A5A5A5A 5A5A5A5A 5A5A5A5A
MOTLoad> mdw -a01a1fff0
01A1FFF0 5A5A5A5A 5A5A5A5A 5A5A5A5A 5A5A5A5A
```

B.2.14 Reference C Function: rsCrc

The following screen shot is an example of the command sequence necessary to produce the CRC.

```
/*
* rsCrc - generate CRC data for the passed buffer
* description:
* This function's purpose is to generate the CRC for the passed
* buffer.
* call:
* argument #1 = buffer pointer
* argument #2 = number of elements
```

```
* return:
* CRC data
*/

static unsigned int
rsCrc (elements_p, elements_n)
unsigned char *elements_p;
unsigned int elements_n;
{
  unsigned int crc;
  unsigned int crc_flipped;
  unsigned char cbyte;
  unsigned int index, dbit, msb;

  crc = 0xffffffff;
  for (index = 0; index < elements_n; index++) {
    cbyte = *elements_p++;

  for (dbit = 0; dbit < 8; dbit++) {
    msb = (crc >> 31) & 1;
    crc <<= 1;

    if (msb ^ (cbyte & 1)) {
     crc ^= 0x04c11db6;
     crc | = 1;
    }
     cbyte >>= 1;
   }
  }
    crc_flipped = 0;
    for (index = 0; index < 32; index++) {
      crc_flipped <<= 1;
      dbit = crc & 1;
      crc_flipped += dbit;
    }

    crc = crc_flipped ^ 0xffffffff;
    return (crc & 0xffff);
  }
```

VME Configuration Parameters

C.1 Introduction

This appendix describes how to manage VME configuration parameters for VME-based products. A few VME configuration parameters are controlled by hardware jumpers while the majority of the parameters are managed by the firmware command utility `vmeCfg`. This command utility provides various options to display, edit, delete, and restore VME configuration parameters.

Note:

- Register locations of VME configuration parameters may differ between PCI-to-VMEbus bridge devices. Refer to the corresponding PCI-to-VMEbus bridge User's Manual for specific details.
- The default VME settings may differ between VME-based products. Refer to the board's Installation and Use manual for the default VME settings.

C.2 CR/CSR Settings

The CR/CSR base address is initialized to the appropriate setting based on the Geographical address; that is, the VME slot number. See the VME64 Specification and the VME64 Extensions for details. As a result, a 512 KB CR/CSR area can be accessed from the VMEbus using the CR/CSR AM code.

C.3 Displaying VME Settings

To display the changeable VME setting, type the following at the firmware prompt:

- **`vmeCfg -s -m`**
  Displays Master Enable state
- **`vmeCfg -s -i(0 - 7)`**
  Displays selected Inbound Window state
- **`vmeCfg -s -o(0 - 7)`**
  Displays selected Outbound Window state
- **`vmeCfg -s -r184`**
  Displays PCI Miscellaneous Register state

- **`vmeCfg -s -r188`**
  Displays Special PCI Target Image Register state
- **`vmeCfg -s -r400`**
  Displays Master Control Register state
- **`vmeCfg -s -r404`**
  Displays Miscellaneous Control Register state
- **`vmeCfg -s -r40C`**
  Displays User AM Codes Register state
- **`vmeCfg -s -rF70`**
  Displays VMEbus Register Access Image Control Register state

C.4 Editing VME Settings

To edit a changeable VME setting, for example on a Universe II PCI-to-VMEbus bridge, type the following at the firmware prompt:

- **`vmeCfg -e -m`**
  Edits Master Enable state
- **`vmeCfg -e -i(0 - 7)`**
  Edits selected Inbound Window state
- **`vmeCfg -e -o(0 - 7)`**
  Edits selected Outbound Window state
- **`vmeCfg -e -r184`**
  Edits PCI Miscellaneous Register state
- **`vmeCfg -e -r188`**
  Edits Special PCI Target Image Register state
- **`vmeCfg -e -r400`**
  Edits Master Control Register state
- **`vmeCfg -e -r404`**
  Edits Miscellaneous Control Register state
- **`vmeCfg -e -r40C`**
  Edits User AM Codes Register state

- **vmeCfg –e –rF70**
  Edits VMEbus Register Access Image Control Register state

C.5 Deleting VME Settings

To delete the changeable VME setting (restore default value), for example on a Universe II PCI-to-VMEbus bridge, type the following at the firmware prompt:

- **vmeCfg –d –m**
  Deletes Master Enable state
- **vmeCfg –d –i(0 - 7)**
  Deletes selected Inbound Window state
- **vmeCfg –d –o(0 - 7)**
  Deletes selected Outbound Window state
- **vmeCfg –d –r184**
  Deletes PCI Miscellaneous Register state
- **vmeCfg –d –r188**
  Deletes Special PCI Target Image Register state
- **vmeCfg –d –r400**
  Deletes Master Control Register state
- **vmeCfg –d –r404**
  Deletes Miscellaneous Control Register state
- **vmeCfg –d –r40C**
  Deletes User AM Codes Register state
- **vmeCfg –d –rF70**
  Deletes VMEbus Register Access Image Control Register state

C.6 Restoring Default VME Settings

To restore all changeable VME settings back to default settings, type the following at the firmware prompt:

vmeCfg –z

Auto Boot

D.1 Overview

Auto boot provides an independent mechanism for booting an operating system where no console is required. MOTLoad does not provide an explicit auto boot command, flag, or parameter. Instead, auto boot is established by appropriately defining the *mot-script-boot* global environment variable (GEV). Refer to *Reserved GEVs* on page 236 for more information on GEVs used by MOTLoad.

Upon start-up, MOTLoad checks for the existence of the GEV *mot-script-boot*. If found, it executes the MOTLoad commands that were entered by the user through the use of `gevEdit`. The user can use this GEV to define a series of commands to be automatically executed when the system is powered on. This command may include the `diskBoot` or `netBoot` commands.

Upon detection of either command, MOTLoad performs the selected boot command using arguments specified either from the command-line argument (stored in mot-script-boot along with the command) or from a GEV. If neither provides the requisite arguments, MOTLoad uses default values that can be viewed using the `help` command on `diskBoot`/`netBoot`. Since some command arguments can not be specified by GEVs, default values are used in these cases where mot-script-boot does not contain the argument's value.

To create the GEVs to use with either boot command, MOTLoad provides the `gevEdit` command. Existing GEVs can be viewed using either `gevList` or `gevShow`.

When using MOTLoad's auto boot mechanism, MOTLoad delays execution of the commands by the amount of time (in seconds) defined in *mot-script-delay*. If *mot-script-delay* is not defined, the default of 7 seconds is used. During this time the boot process can be cancelled by pressing the <ESC> key to return MOTLoad back to its normal boot-up sequence.

Note Auto boot takes affect after a reset and once *mot-script-boot* has been updated to invoke the desired boot command.

To disable auto boot, use `gevEdit` or `gevDelete` to modify mot-script-boot appropriately.

Note Placing the board in safe start disables the auto boot mechanism.

For further information on a specific boot command, refer to the corresponding command description in Chapter 3, *MOTLoad Commands*.

D.2 Auto Boot From a Disk

To auto boot from a floppy disk, hard disk, or CD-ROM, use the `diskBoot` command. MOTLoad selects the boot device from a scan list provided as part of the command-line arguments (if stored in mot-script-boot) or from the diskBoot's corresponding GEV: *mot-boot-path*. Refer to *Reserved GEVs* on page 236 for additional information on this GEV.

Note Because the building of the device tree is performed in background, it is possible to enter a race condition between discovery of the boot device by MOTLoad and a boot request by `diskBoot` (whether manually entered or in *mot-script-boot*). It is advised that users precede a `diskBoot` command by `waitProbe` to ensure that the boot device has been discovered and added to the device tree.

The following depicts an example of setting up an auto boot from a disk:

```
MOTLoad>gevEdit mot-script-boot
(Blank line terminates input.)
diskBoot<cr>
<cr>
MOTLoad>

MOTLoad>gevEdit mot-boot-path
(Blank line terminates input.)
/dev/scsi0/hdisk0\1\\boot\os.bin<cr>
<cr>
MOTLoad>
```

In the above example, MOTLoad downloads the file to the user download area by default. The execution address offset is 0, also by default. The boot file is located on device `/dev/scsi0/hdisk0`, in partition 1, under the `/boot` directory, and the name of the file is*os.bin*

```
mot-script-boot: diskBoot –f/dev/scsi0/hdisk0\1\\boot\os.bin
mot-boot-path: <leave undefined>
```

In the above examples, auto boot is initiated on the next reset or power cycle of the board.

D.3 Auto Boot From the Network

To auto boot across the Ethernet, use the `netBoot` command. The command-line parameters that can be specified by GEVs are listed in *Reserved GEVs* on page 236.

`waitProbe` is not required for network booting; Ethernet devices are "instantly" found. Here is an example of auto booting across a network:

```
MOTLoad>gevEdit mot-script-boot
(Blank line terminates input.)
netBoot -d/dev/enet0 -a0x04000000<cr>
<cr>
MOTLoad>

MOTLoad>gevEdit mot-/dev/enet0-cipa
(Blank line terminates input.)
192.168.1.190
<cr>
MOTLoad>

MOTLoad>gevEdit mot-/dev/enet0-sipa
(Blank line terminates input.)
192.168.1.33
<cr>
MOTLoad>

MOTLoad>gevEdit mot-/dev/enet0-file
(Blank line terminates input.)
/tftpBoot/bootFile.rom
<cr>
MOTLoad>
```

In this example, MOTLoad downloads the file from device *enet0* to the location in memory at 0x04000000. The IP address of *enet0* is 192.168.1.190; the IP address of the source is 192.168.1.33. The execution address offset is 0 by default. The boot file is located in the `/tftpBoot` directory and the boot file name is *bootFile.rom*

In the above example, auto boot is initiated on the next reset or power cycle of the board.

Safe Start and Alternate Boot Image

E.1 Overview

MOTLoad supports a safe-start mechanism that enables customers to recover from inadvertent board configurations that may cause performance degradation, inoperable functionality, or even firmware boot failures. Recent versions of MOTLoad incorporate Alternate Boot Image support as part of Safe Start. The concept of Alternate Boot Image support is to enable a product to retain a pristine copy of MOTLoad firmware in the primary boot block while enabling customers to select an alternate boot image such as an updated version of MOTLoad, a Power On Self Test (POST), or even a bootable kernel or other desired firmware. The primary boot block is intended to contain factory-injected firmware and remain unchanged. Hence, customers can resort to the pristine copy of firmware to recover from software-induced failure conditions.

E.2 Safe Start

Safe Start is typically controllable through an on-board jumper or switch option. MOTLoad's behavior under Safe Start may vary slightly between products but generally entails the following:

- With recent versions of MOTLoad, the MOTLoad boot loader invokes an interactive boot menu that provides the capability to select an alternate boot image. If a user selects an alternate MOTLoad image, the boot loader transfers control to the selected MOTLoad image and the image continues in Safe Start. Note that the Safe-Start jumper or switch option may not impact behavior of other types of boot images; for example, VxWorks.
- MOTLoad ignores all GEVs. For example, MOTLoad disables the autoboot mechanism, defined test suites, configurable POST, SCSI, and ATA probing performance enhancements, and other configurations that are dependent on GEVs.
- MOTLoad bypasses the use of VPD and SPD as configuration parameters.

Note: Without the use of VPD, MOTLoad does not provide Ethernet support for embedded Ethernet controllers since MAC addresses of embedded Ethernet controllers are resident in VPD storage.

- MOTLoad disables use of VME operations for VME-based products. MOTLoad leaves the VME controller in an uninitialized state.

A user can determine whether MOTLoad is in Safe Start by observing the startup banner. Under Safe Start, MOTLoad displays the string: "------SAFE START------" following the Copyright context.

E.3 Alternate Boot Images

In firmware versions with Alternate Boot Image support, MOTLoad's boot-loader code in the primary boot block scans the flash bank for alternate boot images. If the boot loader finds an image, the boot loader passes control to the image. An alternate boot image may be one of three types: POST, USER, or Alternate MOTLoad. A POST image is a user-developed POST that performs a set of diagnostics and then returns to the MOTLoad boot loader. A USER image is a boot image; for example, the VxWorks boot ROM, that performs board initialization. A bootable VxWorks kernel is also considered a USER image. An Alternate MOTLoad image is intended to be an updated copy of MOTLoad firmware. Both a USER and Alternate MOTLoad image are not required to return to the boot loader.

E.4 Firmware Startup Sequence

In firmware versions with Alternate Boot Image support, the firmware startup sequence following board reset is to:

1. Initialize cache, MMU, FPU, and other CPU internal items
2. Initialize the memory controller
3. Search the active flash bank, possibly interactively, for a valid POST image. If found, execute the POST image. If the POST image returns control to the boot loader, continue the POST-image search.
4. Search the active flash bank, possibly interactively, for a valid USER image. If found, execute the USER image. The USER image is not anticipated to return to the boot loader.
5. If a valid USER image is not found, search the active flash bank, possibly interactively, for a valid MOTLoad image. If found, execute the Alternate MOTLoad image. The Alternate MOTLoad image is not anticipated to return to the boot loader.
6. If a valid Alternate MOTLoad image is not found, continue with normal startup of the pristine MOTLoad image in the primary boot block.

E.5 Firmware Scan for Boot Image

During startup, MOTLoad automatically scans the flash bank for an alternate boot image by examining each 1 MB boundary for a defined set of flags that identify the image as being a POST, USER, or Alternate MOTLoad image. Boot images are not restricted to being 1 MB or less in size; however, the images must begin on a 1 MB boundary in the defined 6 MB region of the scanned flash bank. Products that contain flash devices less than 8 MB in size may reduce the size of the alternate-boot-image region or not provide this feature support. The layout of the flash bank is shown below:

Address	Usage
0xFFF00000 to 0xFFFFFFFF	Primary Boot block. (Pristine MOTLoad Image)
0xFFE00000 to 0XFFFFFFFF	Reserved. (Product Specific)
0xFFD00000 to 0xFFDFFFFF	Possible Alternate Boot Image 1
0xFFC00000 to 0xFFCFFFFF	Possible Alternate Boot Image 2
....	Possible Alternate Boot Image x
0xFF800000 to 0xFF8FFFFF	Possible Alternate Boot Image 6

The auto scan is performed downwards beginning at the location of the first possible alternate image and searches first for POST, then USER, and finally Alternate MOTLoad images. In the case of multiple images of the same type, control is passed to the first image encountered in the scan.

MOTLoad provides the means to bypass auto scan through an interactive boot mode. Interactive boot mode may be entered by either setting the Safe-Start jumper/switch or by sending an <ESC> sequence to the console serial port within five seconds following board reset. The interactive menu provides an option to display all locations where a valid boot image resides, specify which valid boot image to execute, continue normal startup; that is, proceed without auto scan, or continue without executing any alternate boot image; that is, proceed without auto scan. The interactive menu is provided to enable recovery in cases when the configured startup sequence is no longer desired or an alternate boot image is malfunctioning. The following output is an example of the interactive menu:

```
Interactive Boot Mode Entered
boot> ?
Interactive boot commands:
'd':show directory of alternate boot images
'c':continue with normal startup
'q':quit without executing any alternate boot image
'r [address]':execute specified (or default) alternate image
'p [address]':execute specified (or default) POST image
'?':this help screen
'h':this help screen
boot> d
Addr FFD00000 Size 00100000 Flags 00000003 Name: MOTLoad
Addr FFC00000 Size 00100000 Flags 00000003 Name: MOTLoad
boot> c

Copyright Motorola Inc. 1999-2005, All Rights Reserved
MOTLoad RTOS Version 2.0, PAL Version 1.1 RM02
```

E.6 Valid Boot Images

An alternate boot image, whether POST, USER, or Alternate MOTLoad, is considered as a valid image through the presence of two "valid image keys" in a boot image header, checksum verification, and other sanity checks. A boot image must begin with a boot image header as defined in the following table:

Name	Type	Size	Notes
UserDefined	unsigned integer	8	User defined
ImageKey 1	unsigned integer	1	0x414c5420
ImageKey 2	unsigned integer	1	0x424f4f54
ImageChecksum	unsigned integer	1	Image checksum
ImageSize	unsigned integer	1	Must be a multiple of 4 bytes
ImageName	unsigned character	20	User defined
ImageRamAddress	unsigned integer	1	RAM address

Name	Type	Size	Notes
ImageOffset	unsigned integer	1	Offset from header start to entry
ImageFlags	unsigned integer	1	Refer to *Boot Image Flags* on page 275
ImageVersion	unsigned integer	1	User defined
Reserved	unsigned integer	8	Reserved for expansion

E.6.1 Checksum Algorithm

The checksum algorithm is a simple unsigned word addition; that is, 4-byte addition, of each word location in the image. The image must be word aligned. The content of the checksum location in the header is not part of the checksum calculation. The algorithm is implemented using the following code:

```
Unsigned int checksum(
     Unsigned int *startPtr,/* starting address */
     Unsigned int endPtr/* ending address */
) {
     unsigned int checksum=0;
     while (startPtr < endPtr) {
         checksum += *startPtr;
         startPtr++;
     }
     return(checksum);
}
```

E.6.2 Boot Image Flags

The image flags define various bit options that control how the boot loader executes the image. These bit definitions are defined in the following table.

Table E-1 MOTLoad Image Flags

Name	Value	Interpretation
COPY_TO_RAM	0x00000001	Copy image to RAM at `ImageRamAddress` before execution

Table E-1 MOTLoad Image Flags (continued)

Name	Value	Interpretation
IMAGE_MCG	0x00000002	Alternate MOTLoad image
IMAGE_POST	0x00000004	POST image
DONT_AUTO_RUN	0x00000008	Image *not* to be executed during auto scan

COPY_TO_RAM

If set, the boot loader copies the image to RAM at the address specified in the header. If not set, the boot loader leaves the image in Flash. In both the instances, the boot loader transfers control to the image entry point as specified in the header.

IMAGE_MCG

If set, the boot loader identifies the image as an Alternate MOTLoad image. If not set (as well as IMAGE_POST flag not set), the boot loader identifies the image as a USER image. This bit should not be set by developers of USER-type images.

IMAGE_POST

If set, the boot loader identifies the image as a Power On Self Test image. This flag is used to indicate that the image is a diagnostic and would execute prior to executing USER or Alternate MOTLoad images.

DONT_AUTO_RUN

If set, the boot loader ignores the image during the auto scan. A user may select the image for execution through the interactive boot mode.

Note MOTLoad currently uses an Image Flag value of 0x3, which identifies itself as an Alternate MOTLoad image that executes from RAM. MOTLoad currently does not support execution from flash.

E.6.3 Board State Requirements

Alternate boot images may expect the board to be in a particular state. Hence, the MOTLoad boot loader attempts to generalize the state of the system as follows upon transferring control:

1. The MMU is disabled.
2. L1 instruction cache has been initialized and is enabled.
3. L1 data cache has been initialized (invalidated) and disabled.
4. L2 cache is disabled.
5. L3 cache is disabled (if present).
6. UART is initialized
7. RAM is initialized and is mapped starting at CPU address 0.
8. RAM is scrubbed of ECC or parity errors if RAM ECC or parity is supported.
9. The active Flash bank (boot) is mapped to the upper end of the address space.
10. Image is copied to RAM at the address specified by `ImageRamAddress` if specified by COPY_TO_RAM.
11. CPU register R1 (the stack pointer) is initialized to a value near the end of RAM.
12. CPU register R3 contains a pointer to the alternate boot data structure.

The boot loader does not perform further initialization of the board than that specified prior to transferring control to an alternate boot image. Alternate boot images need to initialize the board to whatever state the images may further require for its execution.

Only POST images are expected, but not required, to return to the boot loader. Upon return, the boot loader proceeds with the scan for alternate boot images. A POST image that returns control to the boot loader must ensure that upon return the state of the board is consistent with the state of the board prior to POST entry.

E.6.4 Alternate Boot Data Structure

The MOTLoad boot loader uses an alternate boot data structure to provide a user a mechanism to pass POST results to subsequent boot images. The global Data field of the data structure points to an area of RAM that is available for data storage. This RAM location is initialized to zeroes. The boot loader does not clear this area of RAM after execution of a POST image or other alternate boot images.

The alternate boot data structure also provides function pointers to ROM-based UART function calls. This enables booted images to have early access to the console serial port. Below is a description of the alternate boot data structure.

```
/*
 * Structure passed to booted image.
 */
typedef struct altBootData {
     unsigned int ramSize;/* board's RAM size in MB */
     void *flashPtr;/* ptr to this image in flash */
     char boardType[16];/* board name string */
     void *globalData;/* 16 KB  of user defined data, zeroed */
     pVoidFunction_t romCpuGet; /* function ptr to CPU-get call */
    pVoidFunction_t romPutChar; /* function ptr to UART-put call */
    pVoidFunction_t romGetChar; /* function ptr to UART-get call */
     pVoidFunction_t romGetCharReady /* function ptr to UART-ready
call */
     unsigned int reserved[8]; /* reserved for future use */
} altBootData_t;
```

Related Documentation

F.1 Artesyn Embedded Technologies - Embedded Computing Documentation

The publications listed below are referenced in this manual. You can obtain electronic copies of Artesyn Embedded Technologies - Embedded Computing publications by contacting your local Artesyn sales office. For released products, you can also visit our Web site for the latest copies of our product documentation.

1. Go to www.artesyn.com/computing/support/product/technical-documentation.php.
2. Under FILTER OPTIONS, click the Document types drop-down list box to select the type of document you are looking for.
3. In the **Search** text box, type the product name and click GO.

F.2 Related Specifications

For additional information, refer to the following table for related specifications. As an additional help, a source for the listed document is provided. Please note that, while these sources have been verified, the information is subject to change without notice.

Table F-1 Related Specifications

Document Title	Publication Number
MicroC/OS-II - The Real Time Kernel Micrium, http://www.micrium.com	ISBN: 0-87930-543-6
Programming Environments Manuals for 32-Bit Implementation of the PowerPC Architecture Freescale Semiconductor, http://www.freescale.com	MPCFPE32B

Table F-1 Related Specifications (continued)

Document Title	Publication Number
PCI Local Bus Specification PCI Special Interest Group, http://www.pcisig.org	PCI Revision 3.0
American National Standards Institute, http://www.ansi.org	
Information Systems - Small Computer Systems Interface - 2 ANSI	R1999
Information Technology - Portable Operating Systems Interface (POSIX) Base Definitions, Part 1 System Interfaces, Part 2 Shell and Utilities, Part 3 Rationale, Part 4 ANSI	ISO/IEC 9945-1:2002 ISO/IEC 9945-2:2002 ISO/IEC 9945-3:2003 ISO/IEC 9945-4:2002

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